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EVALUATION OF THE FINNISH NATIONAL POLICY ON LARGE CARNIVORES

POHJA-MYKRÄ MARI & KURKI SAMI

Photo: Yle Satakunta / Jari Pelkonen

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FOREWORD

The national population management plans of the Ministry of Agriculture and Forestry for wolverine, lynx, bear and wolf are a key instrument in implementing the national policy on large carnivores. Population management plans have been implemented with the aim to meet the requirements laid out in international agreements for achieving the ecological sustainability of the species, whilst taking into account national needs for ensuring economic and social sustainability. Stakeholder and citizen involvement in the drafting of population management plans has been handled by means of extensive consultations. These consultations and the socioeconomic analyses based on them were included in the Ruralia Institute publications The wolf discourse in Finland (2005), Between lynxes and people (2006), Bear management and public attitudes in Finland (2006), and Wolverine management and public attitudes in Finland (2008).

This evaluation of the national policy on large carnivores includes a comprehensive estimate of the policy objectives and actions led by the Ministry of Agriculture and Forestry in 2007-2012. Development proposals for large carnivore policy were also made based on the results of the evaluation. To serve as the basis for evaluation, an analysis of each species was conducted by examining the success of population management from the perspective of ecological, economic and social sustainability. In examining ecological sustainability, attention was given to trends in large carnivore populations during the review period, the evaluation of threatened species, and bag limit adjustments. Where economic sustainability is concerned, the costs of administration and research as well as allocations for compensating for and preventing damages caused by large carnivores were taken into account. Where social sustainability is concerned, the transparency, involvement and social acceptance of the policy were taken into account.

A key observation made in the development of the large carnivore policy actions is to give equal consideration to ecological, economic and social factors in policy objectives and actions, as well as to state that these three perspectives are interdependent. A touchstone of the current large carnivore policy is exceeding the threshold of social acceptance, particularly where the wolf is concerned. This, in turn, compromises systematic population management built upon the ecological strategy objective. Enhancing the psychological ownership of large carnivores is considered a crucial aspect of ensuring success in future population management.

We would like to extend our most heartfelt thanks to everyone involved in the evaluation. We used risk workshops to involve those implementing the large carnivore policy, i.e. actors from the Ministry of Agriculture and Forestry (MAF), the Finnish Wildlife Agency (FWA), the Finnish Game and Fisheries Research Institute (FGFRI) and Metsähallitus. We also involved operational heads from game management associations and people who have drafted population management plans. In the reindeer husbandry area, we held a risk workshop focusing on the wolverine, which was attended by a large representation of reindeer husbandry actors. At the risk workshops, a risk analysis of the large carnivore policy was conducted, examining what the implemented policy had achieved and why, as well as what means were available for solving the conflict situations. In addition to the above-mentioned workshops, a broad-based stakeholder delegation examined wolf policy development measures in dealing with wolf. Although the data produced at the risk workshops in question was used to support further consideration, the successes, failures and recommendations for improvement highlighted in the evaluation are solely the responsibility of the evaluators.

The evaluation was conducted at the University of Helsinki Ruralia Institute. The steering group appointed by the Ministry of Agriculture and Forestry monitored the progress of the project. Senior Planning Officer Harri Norberg of the Finnish Wildlife Agency served as adviser secretary to the steering group, gathering and analysing the data needed in the evaluation. Graphic designer Jaana Huhtala was responsible for the report layout.

Seinäjoki, February 2014

Authors

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ABSTRACT

This evaluation of the Finnish national policy on large carnivores focuses on the success in accomplishing ecological, economic and social sustainability in population management during the period from 2007 to 2012, through objectives and actions in the implemented population management plans. The conclusions drawn in the evaluation are based on a logical framework which must in practice be seen as the logic behind the policy on large carnivores and associated development actions. Based on this framework, the evaluation highlighted the appropriateness, performance, efficiency and impact of the applied policy on large carnivores as well as the problems and threats of the current policy.

The evaluation was performed for each species by examining the success of population management from the perspectives of ecological, economic and social sustainability. The investigation and consideration of conflicting objectives between various actors, with the view that the population management of large carnivores can be sustainably maintained, played a key role in the evaluation and, particularly, in the development proposals made. The investigation and consideration of the conflicts involved in the population management of large carnivores was in the focus of risk analysis group closely connected to the evaluation. The composition of this group varied by large carnivore species and the group deliberated over existing or potential future conflicts in the current policy on large carnivores as well as solutions for them.

WOLVERINE

As there is no valid population management plan in place for the wolverine, it was not possible to evaluate the success of measures taken in relation to the objectives set for them in the population management plan. However, where wolverines are concerned, a comparison was made in relation to the consultation with regional and national stakeholders that preceded the initial drafting of the population management plan. Existing research data and conflict points identified in the evaluation risk analysis also served as a point of reference. There is a long way to go towards achieving ecological, economic and social sustainability in the population management of wolverines. According to a minimum population estimate, growth in the wolverine population has been extremely moderate, and the wolverine population has been divided into two subpopulations: wolverines with habitats in the northern fells and those in the eastern forests. Specifying the size of the wolverine population is extremely challenging, and very little data has been gathered on the eastern forest wolverine. Roughly half of the wolverine population is found in the reindeer husbandry are, where it poses a great deal of economic problems. Indeed, the wolverine is the leading cause of damage to reindeer stock. Wolverine have been subjected to illegal killing and, without a population management plan or a special decree issued by the Ministry, it has not been possible to manage the wolverine population by means of a derogation procedure.

There has been very little wolverine research conducted during the review period, with the primary focus being on damages to reindeer stock caused by wolverine. The lack and one-sidedness of information on wolverines have failed to meet the perceived needs of stakeholders.

During the review period, damages caused by wolverine to livestock other than reindeer have been extremely minimal, primarily involving a few incidents of damage to sheep stock. On the whole, conflicts outside the reindeer husbandry area are rare, even though a nascent conflict between the wild forest reindeer and wolverines has been identified in the forest reindeer region.

The biggest challenge facing wolverine population management is to put reindeer herders earning their livelihoods in regions of Fell Lapland with wolverine aggregations at the forefront of objectives and actions, thus committing them to the management of the wolverine population through rights and responsibilities. There should be a wide range of measures available, comprehensive and reliable methods for determining the population, an incentive-based damage compensation system, transplantations, derogations which are at least based on damages incurred but preferably also on population management, and other necessary financial incentives.

LYNX

The ecological strategic goal of lynx population management, i.e. the ecological sustainability of the lynx population, has been achieved through the application of existing population management measures. Within the reindeer husbandry area, the lynx population has shown a moderate proliferation and, in other areas of Finland, new habitats have formed together with strong, established lynx populations. At the same time, it has also been found that the ecological carrying capacity has not yet been reached. Growth in the lynx population has given rise to the use of special permits for population management, which have been allocated to achieve a more balanced distribution of regional lynx densities as well as to strengthen the economic and social sustainability of population management. Indeed, high lynx densities are precisely what cause conflicts from an economic and social sustainability standpoint. Damages to reindeer, sheep and hunting dogs as well as game taxation are substantial from an economic perspective. They also put a strain the ability of persons earning a livelihood and hunting to tolerate the presence of lynx. In the reindeer husbandry area, derogations for damages are granted for the specific purpose of preventing substantial economic damages.

For many years, the touchstone of social sustainability in lynx population management has been the unreliability of the minimum population estimate for lynx. There have been challenges in determining the lynx population and an effort has been and is still being made in meeting these challenges in research and game management by developing a census method, investing in separate counts, and scaling population management derogations in order to cull regional population growth. Undoing the deep mistrust that has formed between this research and game management as well as the 'field' is a special challenge where all large carnivores are concerned. Unreliable lynx population estimates are also reflected in the questioning of the reliability of other large carnivore populations.

A challenge in lynx population management is responding quickly to regional lynx problems. It is of the utmost importance to take the sense of insecurity and fear felt about the lynx into consideration, thus avoiding the risk of the lynx falling into disrepute as a pest. Instead, the status of the lynx as a valuable game animal should be promoted and preserved. The cornerstone of this approach is quota hunting. In recent years, population management derogations have served as an excellent tool for achieving economically and socially acceptable population management.

BEAR

The ecological sustainability of bear population management has been achieved by allowing the size of the bear population to grow within the dispersal zone in central parts of Finland and developing a population region in western parts of the country. Conversely, population management derogations have been used to address population growth in the reindeer husbandry area and the established population region in Eastern Finland. Finding a balance has been a challenge and, particularly in the dispersal zone, bear densities have been created.

A local bear presence is revealed by the damage caused by bears. Bears are the biggest cause of damage to sheep stock and, of all the large carnivores, they are the only ones that cause damage to honeybees and crops. In order to improve the economic sustainability of bear population management, electrified fencing, among other things, has been erected to protect property.

From a social sustainability standpoint, bears pose a challenge due to their large size and the sense of fear and insecurity this brings with it. The development of new surveying methods and, particularly, the SRVA ("official assistance in large game matters") founded during the review period to provide official assistance in large game matters have contributed to the expulsion and killing of bears, especially those attempting to enter populated areas.

Where bears are concerned, humans have a completely different concept of property than with other large carnivores. Bears are a major form of prey, and bear hunting has centuries-old traditions. Even today, bear hunting is based on derogations for population management, with derogations for damages being granted in very few cases. Bear hunting is also a team effort, with the use of hunting dogs adding a special nuance to the hunting experience. Regional and local bear ownership is evident in situations where there has been no desire to use all possible derogations for population management in a region with an established population. Responsibility is assumed for growth in the bear population, thus engendering a sense of regional ownership. Furthermore, suspected cases involving the illegal killing of bears are reported to the police with far greater frequency than the suspected illegal killing of other large carnivores. This

might be an indication of the fact that the illegal killing of bear falls clearly outside the boundaries of what is considered the common good and there is no support for such activities.

The challenge facing bear population management is to keep ecological, economic and social acceptance in balance, so that all these factors can be realised from a regional standpoint. This requires greater trust between research and game management as well as the 'field'. However, there is positive development where bears are concerned, which is expected to continue into the future with the current array of actions in place.

WOLF

An unprecedented collapse in the ecological sustainability of the wolf population has been found. After the population management plan entered into effect, the wolf population for the entire country reached its peak in 2007, but has declined since then. The largest single collapse in the wolf population occurred in 2010, and the lowest population level was recorded in 2013, with a minimum population estimate of 120 individuals. This collapse in the wolf population has led to a situation whereby no derogations for population management have been granted for wolves – instead, all population management has been carried out through derogations for damages. The criteria for granting the derogations in question have been found to be challenging, with the capacity utilisation of granted derogations remaining low. Regulations on the killing of large carnivores provided for under the Police Act are applied in situations where human safety is threatened. This in itself has led to a situation where the value of wolves as prey animals has been taken away and the species is seen almost exclusively as a pest with which it is difficult to occupy the same area.

In addition to ecological sustainability, the social sustainability of the wolf population has also collapsed. Local residents feel that they have no influence over managing their livelihoods or daily routines. The presence of wolves instils a sense of fear and insecurity. Wolves are the biggest cause of damages to hunting dogs, thus making hunting more difficult throughout Finland. This is seen as a problem of social acceptability. There is a deep mistrust between the field and research and game management. These differences have made the monitoring of the wolf population more difficult, also due to a failure to report follow-up observations and difficulty in tagging. The withholding of information on wolf observations also calls into question the minimum wolf population estimates. Questioning the position and knowledge of this research has created a situation in society where there is debate over who owns the correct information on wolves.

Where wolf population management is concerned, there is great pressure to take active measures and make immediate adjustments. The biggest challenge facing future wolf population management is placing the rights and responsibilities of people living within wolf territories at the forefront of objectives and actions, committing them to the regional management of the wolf population through these objectives and actions. This requires complete transparency in all population management measures, from objectives to action. There should also be a wide range of measures in place, including comprehensive and reliable population management methods, population management derogations and substantial economic incentives.

IMPACT OF THE NATIONAL POLICY ON LARGE CARNIVORES

The objectives for the population management of large carnivores are set in accordance with the terms for achieving favourable conservation status, as stated in the Habitats Directive. This regulatory standard based on ecological sustainability sets the conditions for the Ministry of Agriculture and Forestry, within which the objectives of the Finnish national policy on large carnivores together with actions taken are applied. Consequently, large carnivore management has been imposed in a top-down manner and has inevitably been lacking in terms of place-based policy. Ecological sustainability has not been based on a population-level approach, which would allow for a wider range of management measures to be taken. Local and regional views concerning the objectives and actions of the national policy on large carnivores have not influenced decision-making as desired. The multilateral conflict that arises around large carnivores is manifested in tensions between local communities, central government, rural and urban areas, laymen and researchers. The denial of national population management objectives and, on the other hand, increasing the level of mistrust between the field and the authorities and the field and researchers have made systematic population control impossible where wolves are concerned. A similar trend seems to be evolving with regard to the wolverine.

The large carnivore actions taken have been called into question by citizens. People do not sup-

port large carnivore policy actions carried out by actors they do not trust. This can be seen in a lack of trust in the methods used in determining a population based on large carnivore observations and the process for granting derogations, compensations for damage and the adoption of preventive measures. Not only is the large carnivore data produced not trusted, it is also widely felt that local and regional views on the objectives of large carnivore population management are not reaching decision-makers. At worst, this mistrust culminates in the illegal killing of large carnivores, which is supported by a broad front. Using public law control measures, it is possible to more effectively discover illegal killing incidents and their perpetrators as well as impose harsher sentences on them. However, it is of the utmost importance to understand that the application of these enhanced measures will not influence the level of public support, which feels that illegal killing is justified. If the needs of people living in large carnivore regions are not met by public administration, they will be met by illegal actions taken in the field.

The current array of actions will not achieve the set performance objectives or the large carnivore policy impact objectives unless the objectives behind these actions are changed. This change in objectives is seen as a way of gaining public approval and support for large carnivore policy measures.

INTERDEPENDENCY OF ECOLOGICAL, ECONOMIC AND SOCIAL FACTORS

In large carnivore policy measures, equal consideration should be given to ecological, economic and social factors both in objectives and actions, stating the interdependency of these three perspectives. Large carnivore policy risks identified in risk analysis groups, which were used in support of this evaluation, showed a clear interdependency between the actions and processes that aim to achieve ecological, economic or social sustainability. The majority of the risks could be categorised as social risks, in addition to which some ecological and economic risks were found to have originated from a social risk phenomenon or, alternatively, could have posed social risks if the situation had remained unchanged. This demonstrates the clear social nature of the risks inherent in the current large carnivore policy, nearly half of which were considered probable and serious. The existing policy risks and problems highlighted in the evaluation have been set as objectives for the future large carnivore policy.

When defining this future policy, the objective of ecological sustainability should not undermine the objective of social sustainability but should, instead, take into account the issue raised in this evaluation. According to this, exceeding the limits of social tolerance will lead to the failure of systematic population management based on an ecological objective.

DEVELOPING THE OWNERSHIP OF LARGE CARNIVORES

The current conservative, top-down approach to decision-making must be phased out. National, regional and local objectives and actions should be synchronised with one another. The primary goal of managing large carnivore populations must be to develop the psychological ownership of large carnivores, particularly at the local and regional level, but also at the national level. The psychological ownership of large carnivores is more effectively developed in situations where ownership involves a sense of community and responsibility. In developing psychological ownership, a sense of ownership is created through practical measures involving rights and responsibilities, thus affecting attitudes.

As a natural resource, large carnivores should be considered property whose management carries with it both rights and responsibilities. Concrete responsibilities must be required and rights should be given regionally and locally, taking into account the differences specific to each species. All actions taken should be entirely transparent. Developing ownership requires trust through all structures and between actors.

PLACE-BASED AND PROBLEM-BASED POPULATION MANAGEMENT

When giving consideration to regional population management, regional diversity must be recognised and regional factors and needs must be taken into account. Conflicts involving large carnivores are local and depend not only on the presence of carnivores, but also on other game resources, livelihoods and infrastructure as well as cultural capital and traditions.

Large carnivore policy actions should be targeted precisely, directly and quickly at local needs. Regional cooperation forums with the ability to respond quickly, along with regional or territorial population management plans, are considered key factors for problem-based solutions to large carni-

vore conflicts. Regional actions should stem from local needs and activate and involve local and/or regional stakeholders, depending on the species of large carnivore and the reason for the conflict. It is possible to integrate public funding and joint stakeholder volunteer work in population management actions.

1 DESCRIPTION OF THE EVALUATION

1.1 BACKGROUND AND PURPOSE

The Ministry of Agriculture and Forestry has drafted national population management plans for wolf (implemented in 2006), bear and lynx (implemented in 2007), as well as wolverine (2014). Population management plans have been implemented in an effort to meet the requirements laid out in international agreements (Bern Convention on Biological Diversity and EU Habitats Directive 92/43/EEC) for achieving the ecological sustainability of the species, whilst taking into account national needs for ensuring economic and social sustainability. Stakeholder and citizen involvement in the drafting of population management plans has been handled by means of extensive consultations.

The Finnish national policy on large carnivores is being carried out by the Finnish Wildlife Consortium, which oversees the viability of game populations, ensures the diverse, sustainable use of game resources and coordinates various expectations related to game management. Population management plans are the most important tool in realising the large carnivore strategy. Large carnivore management plans state that management plans must be updated as needed. This need has now arisen, particularly where the wolf is concerned, but the time has also come for an evaluation of population management involving bear and lynx. With the reform of the Finnish Wildlife Agency, actors in the field are still seeking sustainable approaches. Processes and actions in the implementation of steering, research and practice and, in particular, evaluation of threatened species and views between different stakeholders concerning the management of large carnivore populations have created the need for a comprehensive evaluation of the policy on large carnivores, as well as the updating of national population management plans this evaluation will bring.

The project mission is to conduct a comprehensive evaluation of the development and effectiveness of the national policy on large carnivores overseen by the Ministry of Agriculture and Forestry during the period 2007-2012. In addition, development proposals on the large carnivore policy shall be drafted based on the evaluation. The evaluations must take into account the ecological, economic and social sustainability of the large carnivore policy (Figure 1). Where ecological sustainability is concerned, trends in large carnivore populations during the period under review, the evaluation of threatened species and bag limit adjustments must all be taken into account. Where economic sustainability is concerned, the costs of administration and research as well as allocations for compensat-

Figure 1. Areas of ecological, economic and social sustainability to be taken into account in evaluation of the policy on large carnivores.

ing for and preventing damages caused by large carnivores were taken into account. Where social sustainability is concerned, the transparency, involvement and social acceptance of the policy were taken into account.

The ecological, economic and social sustainability of large carnivore population management achieved through the implementation of population management plan objectives and actions play a key role in the evaluation of the national policy on large carnivores.

The evaluation report addresses the following questions:

1. **Relevance of the large carnivore policy**
   How appropriate are the instituted processes and actions in achieving the set objectives? How effectively are target groups and stakeholders reached and how well are their needs taken into consideration? Can the operating approaches used achieve the desired results and impacts? The areas being evaluated include bag limit adjustments, scaling administration and research involving large carnivores, the compensation for and prevention of damages caused by large carnivores, and the degree of transparency and involvement afforded by the large carnivore policy.

2. **Performance of the large carnivore policy (i.e. achieving set objectives)**
   Have the processes produced the desired results? How effectively do the achieved and anticipated results meet the objectives for ecological, economic and social sustainability?

3. **Efficiency of the large carnivore policy**
   Attention is also given to the assessment of approaches from a performance standpoint as well as their efficiency, i.e. an assessment is made as to how effectively results are achieved using the available resources.

4. **Impact of the national policy on large carnivores**
   How effectively do the realised impacts achieve the objectives set for ecological, economic and social sustainability? Do these meet the expectations of the realised impacts?

5. **External large carnivore policy factors are identified as precisely as possible, and the means for managing and recognising changes in these factors are developed**
   The drafting of a risk analysis in risk workshops helps to test assumptions.

6. **Operational development proposals are made based on addressing the above questions according to observed successful and unsuccessful approaches.**

The investigation and consideration of conflicting objectives between various actors, with a view that the population management of large carnivores can be sustainably maintained, played a key role in evaluation and, particularly, the development proposals made. The investigation and consideration of the conflicts involved in the population management of large carnivores was the focus of the risk analysis group closely connected to the evaluation.

1.2 METHODS AND MATERIALS USED

1.2.1 METHODS

As the evaluation of the large carnivore policy was concerned with both processes and results, the operations being evaluated are examined over a longer period of time. This longer term evaluation examines the initial situation, actions taken and available resources of large carnivore population management as well as the current situation of population management, change occurring within it and its meaning.

An evaluation combines the perspectives of both process evaluation and performance evaluation. The primary purpose of evaluation is to support management, decision-making and the continuous development of operations. It can also be used as an administrative tool. In evaluation, emphasis is placed on the active involvement of evaluation subjects in the planning, processes and continuous improvement based on evaluation results. Project steering group operations are part of the evaluation.

In addition to operating approaches, various operational levels are taken into consideration in evaluations: operational administrators and steering, actors and implementation, target groups and stakeholders. Large carnivore policy operating approaches and actor operations were evaluated, using methods based on the content analysis of existing documentation and the evaluation of data acquisition done in-house.

One tool used to draw conclusions in evaluations was a logical frame of reference, which can in practice be seen as the logic used in large carnivore policy actions and development actions. Were the right measures taken in implementing the large carnivore policy? In other words, did the measures taken meet the development needs and how did the realised impacts fulfil them? An analysis model complying with the logical frame of reference highlighted, in particular, questions raised in the project objectives concerning the evaluation of the large carnivore policy: the relevance, performance, impact, efficiency and external factors of the large carnivore policy.

A qualitative risk analysis of factors affecting the policy was conducted by collecting experience-based information and analysing it in relation to the evaluation questions posed. The 'PAT' (Päättäjät, Asiantuntijat, Toteuttajat) principle was applied in forming the risk analysis group, i.e. decision-makers (päättäjät), experts (asiantuntijat) and actors (toteuttajat) were all invited to join the group. The selection of personnel was steered by an idea stemming from a logical frame of reference according to which problems and threats were examined with regard to the evaluation subject, i.e. the actors implementing the large carnivore policy. The risk analysis group, which varied according to species of large carnivore, examined the conflicts and those which may arise from the large carnivore policy development proposals as well as the solutions for them.

To serve as the basis for evaluation, this analysis was performed for each species by examining the success of population management from the perspective of ecological, economic and social sustainability. The evaluation focused on the impact that the measures, objectives and resources used had on the success of population management. The risk analysis, which accompanied the evaluation, supported development measures for the large carnivore policy.

In addition to a species-based analysis, the delegation of responsibilities among large carnivore policy actors was examined at a general level, and an analysis of the success in advisory work and involving stakeholders and citizens was conducted in evaluating the relevance of the large carnivore policy.

RISK WORKSHOPS

'Risk workshops', which consisted of various experts, were used to support the large carnivore policy evaluation. Risk workshop participants were assembled according to the 'PAT' principle, i.e. decision-makers, experts and actors were invited to the workshops. The selection of personnel was steered by an idea stemming from a logical frame of reference, according to which problems and threats were examined with regard to the evaluation subject, i.e. the actors implementing the large carnivore policy. The evaluators themselves selected the persons to participate in the risk workshops. Risk groups were formed for each species of large carnivore so that the appropriate expertise would always be focused on the large carnivore in question. Three persons from various levels of the Finnish Wildlife Agency were involved throughout the risk workshop process to ensure continuity. Conflicts brought about by the current large carnivore policy and development proposals for each species were addressed in the risk workshops. Outside the reindeer husbandry area, this meant involving two wolf workshops and one lynx and one bear workshop. There were two wolf workshops, the second of which focused on development measures. In this case, the number of participants was greater than that of the first risk workshop. Within the reindeer husbandry area, the risk workshop addressed special problems associated with reindeer herding, with special focus being given to the wolverine. This gave the reindeer husbandry area risk workshop strong competence through the participation of reindeer husbandry experts.

In conducting risk analyses, participants specified and introduced a wide variety of problems and risks facing the current large carnivore policy. In the risk workshops, problems of a similar nature were brought together during the analysis phase, using written documents and discussion notes. Risks were categorised according to whether they were ecological, economic or social. They were also categorised into risk classes according to their overall risk impact. In cases where most members of the risk group had mentioned the same risks whose risk classes differed from one another, the problem was placed under the higher risk class in the table. The evaluation was conducted by categorising probability (P) into classes 1-3, where 1 = improbable, 2 = possible and 3 = probable, and significance (S) into classes 1-3, where 1 = minimal, 2 = adverse and 3 = serious. In accordance with the class assigned to a given risk, the significance of the overall risk is determined as the result of probability and significance (R = P*S) and the measures required (Table 1).

Table 1. In accordance with the class assigned to a given risk, the significance of the overall risk is determined as the result of probability and significance (R = P*S) and the measures required.

Grade	Significance	Measure
1	Insignificant	No measures taken
2	Minimal	Monitor changes in the situation
3, 4	Moderate	Monitor regularly
6	Significant	Take active measures
9	Serious	Take immediate corrective actions

Risk workshops served as occasions for gathering data, not stakeholder consultations. The parties conducting the evaluation used the gathered data as they saw fit in ensuring successful evaluation of the large carnivore policy as well as supporting evaluation guidelines.

The wolf workshop was held twice. At the first wolf workshop (12 June 2013), a risk analysis was conducted for the current wolf policy and, using the risk analysis, problem areas in an alternative wolf policy were tested in an effort to find new ideas for development. **Participants in the first wolf workshop were**: Jukka Bisi (Metsähallitus, drafter of the Wolf Management Plan), Sauli Härkönen (Finnish Wildlife Agency), Jussi Laanikari (Ministry of Agriculture and Forestry), Pekka Kunnas (SRVA), Petri Siutla (Mynämäki Region Game Management Association Operational Director) and Marika Vahekoski (Säkylä-Köyliö Game Management Association Operational Director). The Finnish Game and Fisheries Research Institute (FGFRI) representative was unable to attend.

At the second wolf workshop (9 October 2013), approaches that could be used to change wolf policy problems into objectives were considered. The following people were in attendance: Anne Bland (Chair of the Green Party), Samuli Heikkinen (FGFRI), Sauli Härkönen (FWA), Jussi Laanikari (MAF), Pekka Kunnas (SRVA), Mikko Polvinen (Councillor in Kuhmo, Working Group on Large Carnivores, Chair), Teemu Niinimäki (WWF Finland), Tapio Rintala (Finnsheep Breeders Association of Finland, Chair), Petri Siutla (Mynämäki Region Game Management Association Operational Director), Risto Sulkava (Finnish Association for Nature Conservation (FANC)), Sami Säynevirta (Finnish Nature League) and Marika Vahekoski (Säkylä-¬Köyliö Game Management Association Operational Director). Metsähallitus, the Central Union of Agricultural Producers and Forest Owners (MTK) and Finnish Police representatives were unable to attend.

The risk group for large carnivores in the reindeer husbandry area met on 18 September 2013. At the meeting, a risk analysis was conducted for the current large carnivore policy from a reindeer husbandry area standpoint, and the risk group addressed developing the regulation of the wolverine population and damage compensation system. **The participants at the Reindeer husbandry area risk workshop (18 September 2013) were**: Sauli Härkönen (FWA), Päivi Kainu¬lainen (Regional Council of Lapland), Mika Kavakka (Kemin-Sompio Herding Cooperative District Head), Jukka Knuuti (Reindeer Herders' Association, Chairman of the Board), Jussi Laanikari (MAF), Jari Liimatainen (Game and Fisheries Warden, Metsähallitus), Harri Norberg (FWA), Anne Ollila (Reindeer Herders' Association Executive Director), Aslak Paltto (Sámi Parliament). The Finnish Game and Fisheries Research Institute (FGFRI) representative was unable to attend.

The participants at the bear workshop (17 October 2013) were: Sauli Härkönen (FWA), Reima Laaja (FWA, SRVA Head), Jussi Laanikari (MAF), Pekka Kunnas (SRVA), Sakari Mykrä (drafter of the Bear Population Management Plan), Marko Paasimaa (Finnish Wildlife Agency) and Kalervo Timonen (Metsähallitus). FGFRI and Finnish Police representatives were unable to attend.

The participants at the lynx workshop (18 October 2013) were: Visa Eronen (FWA), Katja Holmala (FGFRI), Sauli Härkönen (FWA), Jussi Laanikari (MAF), Hannu S. Laine (National Wildlife Council), Tuija Liukkonen (drafter of the Lynx Population Management Plan) and Pekka Kunnas (SRVA). The Metsähallitus representative was unable to attend.

In addition to the risk workshops, data was also gathered at a workshop for finding new ideas on how to coexist with wolves, which was held in Pori on 29-30 August 2013. The workshop dealt with the 'Human-Wildlife Transactions: A Pragmatist Approach to Institutional Fit' project, which was funded by the Academy of Finland.

The participants in the wolf workshop were: Hans Peter Hansen (SLU Sweden), Juha Hiedanpää (FGFRI), Antti Här¬kälä (FGFRI), Ilpo Kojola (FGFRI), Sami Kurki (Ruralia Institute, University of Helsinki), Heta Lähdesmäki (University of Turku), John Linnell (Norwegian Institute for Nature Research (NI-NA)), Arto Marjakangas (Finnish Wildlife Agency), Lisa Naughton (University of Wisconsin-Madison), Iiro Naukkarinen (University of Turku), Sanna Ojalammi (FGFRI), Jani Pellikka (FGFRI), Sami Pirkkala (Univer-

sity of Turku), Mari Pohja-Mykrä (Rura¬lia Institute, University of Helsinki), Outi Ratamäki (Finnish Environment Institute SYKE), Nathalia Soethe (Greifswald University), Jan Tore Solstad (Trond¬heim Business School) and Adrian Treves (University of Wisconsin-Madison).

1.2.2 MATERIALS

Data used in evaluations in relation to working approaches and strategic objectives are presented in Table 2 below.

Table 2. Data used in the evaluation of the development relative to the working practices and strategic objectives.

Strategic objective	Population management action to be evaluated	Form and source of data	Implementation method
Ecological sustainability of large carnivore population management	Large carnivore population trends during the review period	FGFRI population estimates 2006-2012, large carnivore tracking methods	Examine population trends during the review period and compare them to population management actions taken during the review period. Examine ways of determining population size that are mutually approved by stakeholders.
	Large carnivore conservation status report	Evaluation of threatened species 2001 and 2010	Investigate the bases for large carnivore conservation status and possible reasons for change.
	Bag limit adjustments for large carnivores	Derogations and quotas police regulations (section 16 of the Police Act)	Examine success of bag limit adjustments in relation to population size trends.
Economic sustainability of large carnivore population management	Administrative and research costs	Statistics on administrative and research costs during the review period	Summary of research conducted during the review period. Analysis of performance and resource management cost-effectiveness.
	Appropriations allocated for the compensation and prevention of damages caused by large carnivores	Large carnivore damage statistics and compensations paid. Various preventive measures taken and their costs.	Analysis of how funds allocated for compensation for damages and prevention meet actual needs as well as their cost-effectiveness, and involvement in achieving social acceptance of population management, for example, with regard to various forms of livelihood
Societal and social sustainability of large carnivore population management	Transparency of the large carnivore policy	Information provided by the public game and wildlife organisations during the review period	Analysis of comprehensiveness of information and stakeholder positions.
	Large carnivore policy involvement	Studies on stakeholder citizen consultations to support large carnivore population management. Summaries of regional wildlife council stakeholder consultations on large carnivores (autumn 2013)	A summary is drafted on the wishes of citizens and stakeholders regarding population management as well as their realisation and any changes made during the review period.
	Social acceptance of the large carnivore policy	Research results on the illegal killing of large carnivores. Interview with a game and fisheries warden.	Analysis of stakeholder and citizen approaches to actively and passively defying the large carnivore policy, and conducting an analysis of its gravity and required measures.

1.3 ORGANISATION AND SCHEDULING OF THE EVALUATION

The steering group appointed by the Ministry of Agriculture and Forestry monitored the progress of the project. The steering group convened a total of three times (see Figure 2). The steering was comprised of the following:

Chair: Permanent Secretary Jaana Husu-Kallio, Ministry of Agriculture and Forestry
Deputy chair: Director General Juha Ojala, Ministry of Agriculture and Forestry
Second Vice: President Heikki Paltto, Sámi Parliament

Members:

- Deputy Director General Christian Krogell, Ministry of Agriculture and Forestry
  Deputy member Ministerial Adviser Sami Niemi, Ministry of Agriculture and Forestry
- Senior Adviser Matti Osara, Ministry of the Environment
- Police Inspector Seppo Sivula, Ministry of the Interior
  Deputy member Major Urpo Riissanen, Finnish Border Guard
- Chairman Hannu S. Laine, National Wildlife Council
  Deputy member Game Husbandry Manager Jarkko Nurmi, Finnish Wildlife Agency
- Head of Unit Riitta Rahkonen, Finnish Game and Fisheries Research Institute
  Deputy member Research Director Vesa Ruusila, Finnish Game and Fisheries Research Institute
- Senior Researcher Ulla-Maija Liukko, Finnish Environment Institute
- Game and Fisheries Planner Madeleine Nyman, Metsähallitus
  Deputy member Game and Fisheries Manager, Jukka Bisi, Metsähallitus
- Farmer Aarno Puttonen, Central Union of Agricultural Producers and Forest Owners (MTK).
- Sub-editor Anna Grenfors, Finnish Hunters' Association
  Deputy member Executive Manager Panu Hiidenmies, Finnish Hunters' Association
- President of the Board Risto Sulkava, Finnish Association for Nature Conservation

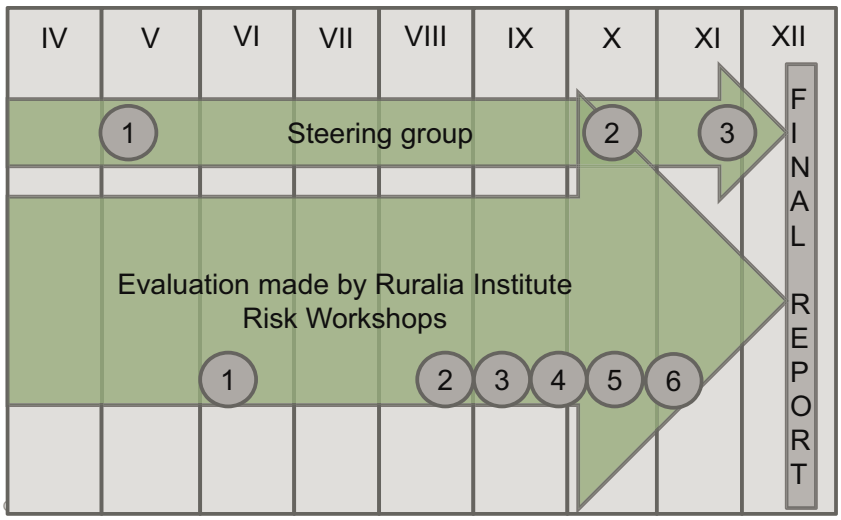

Figure 2. Evaluation timetable for April-December 2013. The steering group convened three times and risk workshops, which supported the evaluation work, were held five times. Figure legend: H = Expert interview – Game and fisheries warden Markus Aho (Oulu Province, Western Finland) 4 June 2013; W = Wolf workshop on the Academy of Finland-funded FITPA (Human-Wildlife Transactions: A Pragmatist Approach to Institutional Fit) project, held on 29-30 August 2013 in Pori; Risk workshops 1 = First wolf workshop 12 June 2013; 2 = Reindeer husbandry area large carnivore workshop 18 September 2013; 3 = Second wolf workshop 9 October 2013; 4 = Bear workshop 17 October 2013; and 5 = Lynx workshop 18 October 2013.

Deputy member Nature Conservation Officer Tapani Veistola, Finnish Association for Nature Conservation
- Programme Director Petteri Tolvanen, WWF Finland
- Executive Director Anne Ollila, Reindeer Herders' Association
  Deputy member Chairman of the Board Jukka Knuuti, Reindeer Herders' Association

Senior Planning Officer Harri Norberg, Finnish Wildlife Agency
Project Manager Mari Pohja-Mykrä, University of Helsinki Ruralia Institute

The University of Helsinki Ruralia Institute oversaw the implementation and reporting of the evaluation project. The evaluation was prepared by Project Manager Mari Pohja-Mykrä, who also served as secretary to the steering group and risk workshops along with Director Sami Kurki. Trainee Susanna Valkama participated in the preparation of the evaluation by researching the social sustainability of the policy on large carnivores. Senior Planning Officer Päivi Pylkkänen participated in the preparation of the project plan. Senior Planning Officer Harri Norberg of the Finnish Wildlife Agency served as adviser secretary to the steering group, gathering and analysing the data needed in the evaluation.

The evaluation was conducted during the period 1 April–20 December 2013. The steering group convened three times: 8 May, 29 October and 16 December 2013. The evaluation was submitted to the Ministry of Agriculture and Forestry in PDF format on 20 December 2013.

2 DESCRIPTION OF THE OPERATING ENVIRONMENT AND LARGE CARNIVORE POLICY IN FINLAND

2.1 INTERNATIONAL AGREEMENTS AND EU LEGISLATION

2.1.1 BERN CONVENTION

The primary objective of the Bern Convention on the Conservation of European Wildlife and Natural Habitats is to protect endangered species and their habitats. A particular effort is made to protect species and natural areas that require the cooperation of multiple states. The concept of the Convention's equivalent to the principle of 'favourable conservation status' states that: 'The Contracting Parties shall take requisite measures to maintain the population of wild flora and fauna at, or adapt it to, a level which corresponds in particular to ecological, scientific and cultural requirements...'. The Bern Convention was opened for signature in 1979 and ratified by Finland on 1 April 1986.

In the Appendices to the Bern Convention, species are divided into strictly protected fauna species (Appendix II) and protected fauna species (Appendix III). Under the Convention, the wolverine, bear and wolf are strictly protected species, whilst the lynx is listed as a protected species. Strict protection means that the intentional hunting, disturbing or killing of a given species is prohibited and that the species in question must be protected, especially during mating season. In its ratification of the Convention, Finland made an exception, excluding bear and wolf from the protection afforded under the Convention. The Convention allows the contracting parties to make exemptions to conservation obligations, for example, in order: '...to prevent serious damage to livestock or other property (...) in the interests of public health and safety (...) for the purposes of research and education, for translocation and for the necessary breeding...'.

2.1.2 CONVENTION ON BIODIVERSITY

The objective of the world's first global agreement on biodiversity conservation, i.e. the Convention on Biological Diversity, is: 'the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.' The sustainable use of its components must be realised so that the quality or quantity of use will not degrade biological diversity. The Convention on Biological Diversity was opened for signature on 5 June 1992 at the United Nations Conference on Environment and Development in Rio de Janeiro. The Convention has been ratified by 190 countries, 168 of which are also signatories of the Convention.

Finland ratified the Convention on Biological Diversity on 26 October 1994. The Convention is legally binding and its contents are primarily incorporated in the Nature Conservation Act (1096/1996). In 1996, the Ministry of the Environment formed the National Committee for Biodiversity in Finland, which is comprised of key business sectors, environmental organisations and ministries. The Committee drafted the National Action Plan for Biodiversity in Finland 19972005[1], which was extended in the 'Saving Nature for People' National Action Plan for the Conservation and Sustainable Use of Biodiversity in Finland 2006-2016. Its strategic objective was to halt the loss of biodiversity in Finland by 2010 by, among other things, enhancing the conservation of flora and fauna as well as developing the nature conservation network. The Action Plan mission statement – which declares that the habitats of game animals, natural lifestyles and preservation of the natural annual cycle must be ensured – is essential from a large carnivore standpoint. In addition, it states the desire to enhance the monitoring of game populations and, using the data obtained, ensure its sustainable management

[1] Kangas, P., Jäppinen, J-P., von Weissenberg, M. & Karjalainen, H. 1997. Suomen biologista monimuotoisuutta koskeva kansallinen toimintaohjelma 1997-2005. Ympäristöministeriö, Helsinki; Luonnon puolesta - ihmisen hyväksi. Suomen luonnon monimuotoisuuden suojelun ja kestävän käytön toimintaohjelma 2013–2020

and use[2]. The most recent Action Plan was updated for 2013– 2020[3].

2.1.3 CITES

CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) was introduced on 1 July 1975, with Finland ratifying the Convention on 8 August 1976. CITES has been signed by 179 states. The purpose of CITES is to protect wild flora and fauna by overseeing international trade in them.

Enacted in 1997, the CITES Regulation (EU) No. 338/1997 is directly applicable in Member States. The content and endangered species annexes of the CITES Regulation are more comprehensive than those of the CITES Convention.

Where large carnivores in Finland are concerned, the CITES Convention applies to lynx, bear and wolf, but wolverine is not listed in the annexes of the CITES Convention or EU CITES Regulation. Species included in the CITES Convention are listed in the three endangered species annexes of the EU CITES Regulation according to their conservation status. In EU legislation, bear, lynx and wolf are listed in Annex A, which contains species subject to the strictest regulation. The CITES Convention and its related EU Regulation fall within the administrative purview of the Ministry of Agriculture and Forestry.

2.1.4 EUROPEAN UNION HABITATS DIRECTIVE

The primary objective of Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, otherwise known as the Habitats Directive, is to promote the preservation of biodiversity, taking economic, social, cultural and regional requirements into consideration. The Habitats Directive distinguishes between the conservation of species and the conservation of habitats.

The wolverine is included among species in Special Areas of Conservation listed in Annex II of the Habitats Directive. The wolverine is therefore considered a seriously threatened species within the EU, with the EU bearing special responsibility for its conservation within its natural range. The lynx, bear and wolf are included among the species in need of strict protection listed in Annex IV. In cases involving the wolf, a national exception has been made, which basically allows for regulation of the wolf population within the reindeer husbandry area. In Finland, wolf within the reindeer husbandry area are listed in Annex V of the Habitats Directive. The Habitats Directive allows derogation from strict protection, also including species in need of strict protection listed in Annex IV under certain conditions specified in Article 16 of the Habitats Directive.

Article 16 of the Habitats Directive stipulates more precisely the details which may be applied: '... (a) in the interest of protecting wild fauna and flora and conserving natural habitats; (b) to prevent serious damage, in particular to crops, livestock, forests, fisheries and water and other types of property; (c) in the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment; d) for the purpose of research and education, or repopulating and reintroducing of the species and for the breeding operations necessary for these purposes, including the artificial propagation of plants; (e) to allow, under strictly supervised conditions, on a selective basis and to a limited extent, the taking or keeping of certain specimens of the species listed in Annex IV in limited numbers specified by the competent national authorities.'

As the Habitats Directive obligates the Member States, national legislation must be in accordance with the Directive's requirements and may not deviate from the obligations stipulated in it. In Finland, the Habitats Directive has been incorporated in the Hunting Act (615/1993) and the Hunting Decree (666/1993). Provisions concerning large carnivores are also given in the Government Decree on Derogations Laid down in the Hunting Act (169/2011, 452/2013).

2.1.5 FAVOURABLE CONSERVATION STATUS

In defining the favourable conservation status of large carnivore populations in Finland, fulfilment of the protection requirements stated in the Bern Convention, the Convention on Biodiversity and the Habitats Directive must be taken into account. The term 'favourable conservation status' was first presented in international nature conservation forums in the Bonn Convention, or the Convention

[2] Heikkinen, I. (toim.) 2007. Luonnon puolesta – ihmisen hyväksi. Suomen luonnon monimuotoisuuden suojelun ja kestävän käytön strategia ja toimintaohjelma 2006–2016. Suomen ympäristö 35, Ympäristöministeriö, Edita Prima OY, Helsinki.

[3] Luonnon puolesta - ihmisen hyväksi. Suomen luonnon monimuotoisuuden suojelun ja kestävän käytön toimintaohjelma 2013–2020 <http://www.ym.fi/fi-FI/Luonto/Luonnon_monimuotoisuus/Strategia_ja_toimintaohjelma>

on Migratory Species, on 23 June 1979. Signed later that year, the Bonn Convention itself did not use the term 'favourable conservation status', but it did make reference to the same conservation principles.

The Bonn Convention contained three criteria for achieving favourable conservation status, which were also later used in the Habitats Directive. Upon meeting these requirements, the requirements for preventing the degradation of nature laid out in the Convention on Biodiversity are also met. Under the Habitats Directive, the level of favourable conservation status is achieved when:

1) '...population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats.'
2) the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future.
3) there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis'.

In accordance with Article 17 of the Directive, once every six years each EU Member State must draft a report on the conservation status of its Directive species and submit it to the Commission. The evaluation examines the status of the range, population and habitat of a given species, and estimates its future prospects based on the parameters mentioned above. These parameters are classified using a three-point scale: favourable, unfavourable-inadequate and unfavourable-bad. If the amount of information on a given species is insufficient for making an estimate, the classification assigned is 'unknown'. These parameters are combined to form the overall assessment of the conservation status of the species. A separate assessment is conducted for each biogeographic region within the EU. In Finland this means boreal (everything except Fell Lapland) and alpine (Fell Lapland) regions, along with the Baltic Sea. Finland's most recent report on the enforcement of the Habitats Directive submitted to the Commission covered the period 2007-2012 (see section 3.1.1.).

2.2 NATIONAL GAME MANAGEMENT

In Finland, the Habitats Directive has been incorporated in the Hunting Act (615/1993) and Hunting Decree (666/1993). The large carnivore policy is steered and controlled by means of policy decisions. The Wildlife and Game Administration Act (158/2011) regulates game administration actors, which implement large carnivore population management actions.

Hunting and game management executives and game management associations operate under the Ministry of Agriculture and Forestry and the Finnish Wildlife Agency. National game policy is also promoted by the National Wildlife Council and Regional Wildlife Councils.

The Finnish Wildlife Agency is Finland's national game management development and advisory organisation, which promotes sustainable game management, supports game management associations and carries out the public administration tasks assigned to it. Local game administration units are game management associations which operate under the Finnish Wildlife Agency. Game research is conducted by the Finnish Game and Fisheries Research Institute (FGFRI), which operates under the Ministry of Agriculture and Forestry. Its mandate is specified in the Act on the Finnish Game and Fisheries Research Institute (1987/1131).

The National Wildlife Council is a body that supports national game policy, and its purpose is to address matters pertaining to game management. In addition, a total of 15 Regional Wildlife Councils have been assigned to supervise operations within the jurisdiction of the Finnish Wildlife Agency – these were formerly game management districts. The operations of Regional Wildlife Councils are regulated in the Wildlife and Game Administration Act (158/2011) and Decree (171/2011). The Regional Wildlife Councils are strategic regional bodies, which promote game policy and participate in its preparation.

The objective of Regional Wildlife Councils is to increase open, interactive stakeholder cooperation in game management and work towards promoting the harmonisation of various interests. Regional Wildlife Councils also participate in the preparation and updating of national management plans and supervise regional stakeholder consultations regarding management planning work. Matters to be addressed in meetings are prepared and presented by an officer of the Finnish Wildlife Agency.

Regional Wildlife Councils are comprised of ten members, six of whom represent regional game management associations. Representatives from the respective regional council, the Centre for Economic Development, Transport and the Environment (ELY Centre), the Finnish Forestry Centre and the regional landowner organisation also sit on the regional wildlife council. The Ministry of Agriculture and Forestry appoints the Regional Wild-

life Councils. Each term is three years in duration; the first term was 2011-2014.[4]

The Finnish Wildlife Consortium is comprised of organisations that are under the performance guidance of the Ministry of Agriculture and Forestry or receive a substantial proportion of their operating funds from the Ministry of Agriculture and Forestry budget. The Finnish Wildlife Consortium is comprised of the Ministry of Agriculture and Forestry, the Finnish Wildlife Agency, game management associations, the Finnish Game and Fisheries Research Institute (FGFRI), Metsähallitus (Natural Heritage Services), the Finnish Forest Research Institute (Metla) and Finnish Food Safety Authority Evira. On 26 March 2012, the Ministry of Agriculture and Forestry formed a project group to prepare a plan for merging the MTT Agrifood Research Finland, Metla and FGFRI to form a single administrative entity, the Natural Resources Institute Finland as from the beginning of 2015.

Social impact objectives have been set for game administration in order to balance healthy game populations, ethical and responsible hunting, well-managed game conflicts and damages caused by game. Another objective for game administration is to create well-being through game management.

2.2.1 POPULATION MANAGEMENT PLANS

In 2000, the European Council completed an official statement and programme regarding the management of large carnivore populations, in which the stated objective was to have Member States prepare national management plans for all large carnivores. The official statement also listed species-specific programmes, the purpose of which was to serve as action plans for supporting decision-making on a pan-European basis.

Formed by the World Wide Fund for Nature (WWF) and comprised of experts and organisations from various European countries, the Large Carnivore Initiative for Europe (LCIE) is an advisory body that serves as a working group under the International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC). The LCIE encourages placing a focus on a population-based analysis in large carnivore population management where the population crosses over the borders of different states[5]. Made by parties to the Bern Convention, Recommendations No. 59 (1997), No. 115 (2005) and No. 137 (2008) give attention to large carnivore population management policies, with a particular focus on population-based analysis, whilst taking cooperation between states within and without the European Union into consideration.

Within the framework of these international conservation agreements, Finland drafted population management plans for wolf in 2005 and for lynx and bear in 2007[6]. The population management plan for wolverine was drafted in 2007, and adopted in 2014. The primary objectives of the population management plans for lynx, bear and wolf are presented below in italics, stating that they are to be realised using the actions specified therein. Hereinafter, all cited texts shown in italics are direct quotes from the large carnivore population management plans.

> *'The main objective of the conservation, management and regulation of Finland's lynx population is to maintain the favourable conservation status of the lynx population in the future. The measures carried out should take into consideration economic and social demands and special regional and local features. In areas where there are high lynx population densities, the impact of lynx on the development of other species of wild fauna should also be taken into account.'*

> *'The main objective of the conservation, management and regulation of Finland's bear population is to maintain the favourable conservation status of the bear population in the future. The measures to be carried out will take into consideration economic, social and education demands and special regional and local features'.*

> *'The fundamental aim of management and conservation of the wolf population is to maintain a favourable conservation status for the wolf. The measures to be carried out will take into consideration economic, social and education demands and special regional and local features.'*

Following the drafting of the population management plans, there arose a need to further examine the challenges facing the social sustainability of population management throughout Europe. For

[4] http://riista.fi/riistahallinto/alueelliset-riistaneuvostot/

[5] Blanco, J.C. (toim.) 2012: Towards a population level approach for the management of large carnivores in Europe. Challenges and opportunities. <http://www1.nina.no/lcie_new/pdf/634994157007889476_Task%203-Transboundary%20coop.pdf>

[6] Suomen susikannan hoitosuunnitelma MMM, 11/2005; Suomen ilveskannan hoitosuunnitelma MMM 1/2007; Suomen karhukannan hoitosuunnitelma MMM 2/2007.

example, in Spain's Iberian and Sierra Morena mountain ranges, wolf conflicts have increased[7], as they have in France, particularly among cattle breeders[8]. Sweden has already drafted new large carnivore population management policies through objectives set for social sustainability[9]. It seems that the objectives for large carnivore population management are gradually changing. In the most recent Recommendation (No. 163, 2012) made by parties to the Bern Convention, an emphasis is placed on ensuring the social sustainability of population management[10]. In June 2013, the LCIE prepared a statement, according to which understanding the conflict and tackling it are crucial to giving consideration to large carnivore population management[11].

STAKEHOLDER CONSULTATION AND INVOLVEMENT

The views, expectations and requirements concerning population management held by key regional and national stakeholders were examined to serve as the basis for drafting national population management plans. The objectives of these various stakeholders and citizens are described in University of Helsinki Ruralia Institute studies, *The wolf discourse in Finland* (2005), *Between lynxes and people* (2006), *Bear management and public attitudes in Finland* (2006), and *Wolverine management and public attitudes in Finland* (2008).[12]

In a written survey conducted in 2004, regional stakeholders were consulted in the preparation of population management plans. Key parties directly involved with nature, its use and the supervision of its use were chosen as the regional stakeholder respondents. These were nature conservation districts, Regional Councils, agricultural producers, rural advisory centres, Forestry Centres, the Regional Federation of Forest Owners, Finnish Hunters' Association districts, kennel districts, Metsähallitus, tourism operators, police districts, the Finnish Border Guard, game management districts and associations, the Reindeer Herders' Association, Rural Departments of the Employment and Economic Development Centre (ELY Centres; earlier TE Centres) and Environment Centres.

A total of 221 responses to the wolf survey were received, 203 to the bear survey, 239 to the lynx survey and 204 to the wolverine survey. A total of 15 regional stakeholder consultations on wolf and 15 combined consultations on bear and lynx were held in each game management district. For wolverine, a regional stakeholder consultation was held in the Lapland game management district, where the wolverine population density is the highest. National stakeholders were also consulted on the wolverine, lynx and bear, by means of both a written survey and a national stakeholder meeting.

Public hearings on wolf, bear and lynx, i.e. events open to the public within the game management districts at that time, were held. In 2004, a total of 30 wolf consultations attended by some 1,600 participants were held in all game management districts. Seven combined bear and lynx consultations attended by a total of 176 participants were held in 2005 within the game management districts. Issues related to large carnivores and their population management were also addressed in one-to-one interviews aimed specifically at large carnivore experts. The interviews concerning lynx and bear were conducted at the same time, so that they focused on the respective area of expertise of the 32 persons being interviewed. A total of 17 experts were interviewed concerning wolverine.

ADVISORY COMMITTEE ON LARGE CARNIVORES

In addition to national game administration, matters concerning large carnivores were addressed by volunteer regional Advisory Committees on Large Carnivores, which mostly operate under Regional Councils. The Advisory Committees on Large Carnivores are comprised of representatives of various stakeholders (Table 3), with the aim being to tackle matters concerning large carnivores and their management in an effort to alleviate conflicts involving them. The Advisory Committees on Large Carnivores play a key role in the dissemination of researched information on large carnivores to vari-

[7] Report from a Stakeholder Workshop on EU Action on Large Carnivores Brussels, 25 January, 2013 Executive Summary

[8] Ranskan susiohjelma 2013-2017

[9] Regeringens proposition 2012/13:191: En hållbar rovdjurspolitik

[10] Recommendation No 163 (2012) of the Standing committee, adopted on 30 November 2012, on the management of expanding populations of large carnivores in Europe.

[11] A manifesto for Large Carnivore Conservation in Europe, 6/2013

[12] Bisi & Kurki 2005. Susipuhetta Suomessa. Julkaisuja 3, Maaseudun tutkimus ja koulutuskeskus, Helsingin yliopisto, Seinäjoki; Liukkonen ym. 2006. Ilveksiä ja ihmisiä. Julkaisuja 7, Ruralia-instituutti, Helsingin yliopisto, Seinäjoki; Mykrä ym. 2006. Kansalaisten karhukannat. Julkaisuja 6, Ruralia-instituutti, Helsingin yliopisto, Seinäjoki; Pohja-Mykrä & Kurki 2008. Asialistalla ahma. Julkaisuja 13, Helsingin yliopisto, Ruralia-instituutti. Oy Fram Ab, Vaasa.

Table 3. Advisory Committees on Large Carnivores and the stakeholders participating in them. The following abbreviations are used for the Advisory Committees on Large Carnivores: South Karelia = SK, South Savo = SS, Kainuu = Ka, Central Finland = CF, North Karelia = NK, North Savo = NS, Reindeer husbandry area large carnivore committee = RH, Swedish-speaking Ostrobothnia = SO, Satakunta = SA and Southwest Finland = SF. The year in which the Advisory Committees on Large Carnivores were set up is listed under the abbreviation. The table is based on the large carnivore committee table of Pellikka & Salmi (2007).

STAKEHOLDERS	SK 2006-	SS 2010-	Ka 2007[13]	CF 2006-	RH 2013 -	NK 1999-	NS[14] 2004-	SO 2007-	SA 2009-	SF 2008-
Kennel district	x	x	x	x		x	x	x	x	x
Regional Council	x	x	x	x	x	x	x	x	x	x
MTK	x	x	x	x	x	x	x	x	x	x
Police	x	x	x	x	x	x	x	x	x	x
Finnish Wildlife Agency	x	x	x	x	x	x	x	x	x	x
TE Centre	x	x	x	x	x	x	x	x	x	x
Volunteer hunter associations	x	x	x	x	x	x	x	x	x	x
Finnish Environment Institute	x		x	x	x	x	x	x	x	
Professional fishermen									x	
Animal and nature conservation organisation	x			x	x			x	x	x
Wilderness and nature tourism operators			x				x			
Fishermen's federation								x		
Municipality	x	x					x		x	
Village Council		x		x				x		
Bird association									x	
State Provincial Office						x				
Metsähallitus		x	x		x	x	x		x	x
Forest Owners' Union	x	x		x		x	x	x		
Finnish Forest Research Institute						x				
Reindeer herding associations			x		x					
Finnish Border Guard					x	x				
FGFRI			x			x		x	x	
Sámi Parliament					x					
FANC Nature conservation district	x	x	x	x	x	x	x		x	
Finnish Transport Agency			x			x				
University/other education institution				x		x			x	x

[13] There has been an Advisory Committee on Large Carnivores in Kainuu in 2000-2005 and from the autumn of 2007.

[14] North Savo has a large carnivore working group, steered by the Advisory Committee on Large Carnivores.

ous stakeholders. The committees can also serve as initiators in regional issues involving large carnivores.[15]

At present, there are ten Advisory Committees on Large Carnivores: South Karelia, South Savo, Kainuu, Central Finland, Northern Finland, North Karelia, North Savo, Swedish-speaking Ostrobothnia, Satakunta and Southwest Finland (Table 3).[16] In addition to the regional Advisory Committees on Large Carnivores, there is a large carnivore committee for the reindeer husbandry area and large game forums in Uusimaa and South and North Häme, which deal with cervids as well as large carnivores.

2.2.2 DEROGATIONS

Large carnivores are protected game animals. Exceptions to this protected status can, however, be made by granting derogations, in accordance with applicable requirements stated in the Hunting Act. Derogations can be divided into two types: those granted on a population management basis[17] and those on a damage basis[18].

Derogations on a population management basis may be granted for lynx, bear and wolf during periods more precisely defined in the Government Decree on Derogations Laid down in the Hunting Act (452/2013). The hunting season for lynx is 1 December–28 February, for bear 20 August–31 October, and for wolf in the reindeer husbandry area 1 October–31 March and the rest of Finland 1 November–31 March. Derogations on a population management basis may be granted under carefully supervised conditions for the limited hunting or killing of select individuals of a given species. In Finland, derogations on a population management basis are only granted for lynx and bear.

Derogations on a damage basis may be granted for wolverine, lynx, bear and wolf at any time, under the condition that the Ministry of Agriculture and Forestry has issued a decree restricting the maximum permitted number of kills for a given species. Under a derogation granted on a damage basis, any large carnivore killed belongs to the state and must be turned over to the body conducting research on game animals, i.e. the Finnish Game and Fisheries Research Institute (FGFRI). Otherwise, large carnivores killed by humans, such as in traffic, are usually turned over to Finnish Food Safety Authority Evira. Large carnivores found dead are also sent to Evira for post-mortem examination.

By decree, the Ministry of Agriculture and Forestry regulates how many lynx, bear and wolf individuals may be hunted each year under a derogation. The maximum number of individuals to be taken under derogations is determined in accordance with the Habitats Directive (92/43/EEC) requirements for achieving and maintaining a favourable conservation status. The Ministry of Agriculture and Forestry steers and supervises the Finnish Wildlife Agency, which is authorised by the Game Administration Act (158/2011) to grant derogations for game animals up to the specified maximum number of individuals to be taken. The Finnish Wildlife Agency also exercises discretion in cases involving the Habitats Directive (92/43/EEC) requirements for achieving a favourable conservation status and maintaining it.

The Finnish Wildlife Agency determines whether the principles for granting a derogation specified in section 41a of the Hunting Act are fulfilled in a written derogation application. Derogations on a damage basis may be granted: '...1) in the interest of protecting wild fauna or flora; 2) to prevent serious damage, in particular, to crops, livestock, forestry, fisheries, reindeer husbandry, water of other property; 3) in the interest of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment; or 4) for the purposes of research and education, repopulating and re-introducing of these species or preventing animal diseases.' It is also determined whether there is no satisfactory alternative to granting a derogation.

Large carnivores displaying abnormal behaviour and posing a safety threat are primarily eliminated in accordance with section 16 of the Police Act (formerly section 25), whenever necessary. This involves situations that are increasingly threatening and pose a serious hazard to human life, health or property in which there is no time to determine the application requirements of the Hunting Act or Decree. According to a statement issued by the Deputy Ombudsman (Rec. no 612/4/04), the Habitats Directive also obligates the police in the interpretation of the Police Act. On the other hand, according to a statement issued by the Chancellor

[15] Pellikka, J., Salmi, P. & Ratamäki, O. 2008. Alueelliset suurpetoneuvottelukunnat ristiriitojen hallinnassa. Riista- ja kalatalous –tutkimuksia, 2/2008.

[16] Pellikka, J. & Salmi, P. 2007. Osallisuus suurriistakantojen sidosryhmäneuvotteluissa – keitä maakunnallisissa riista-asioissa kuullaan? Suomen riista 53: 64-75.

[17] Hunting Act 41 a(3)

[18] Hunting Act 41 a(1)

of Justice, the purpose of the government is to promote both human safety, as guaranteed in the Constitution of Finland, and the biological diversity of nature. If these two objectives are in conflict with one another, priority is given to protecting humans from predatory animals (Rec. no. 11/21/98).

2.2.3 COMPENSATION FOR DAMAGE CAUSED BY LARGE CARNIVORES

In the amended Game Animal Damages Act (105/2009), the deductible to be paid by the party suffering damages has been eliminated and, particularly where the disturbance of reindeer herding is concerned, an effort has been made to more effectively respond to the damage caused to reindeer by large carnivores by increasing the amount of compensation. The Game Animal Damages Act specifies three types of compensation for damage to reindeer: compensating for damage to reindeer, compensating for loss of calves, and exceptionally large damage to reindeer. The latter two compensation types are new additions to the amended Game Animal Damages Act.

The compensation paid for damage to reindeer is based on the reindeer found. The compensation for the loss of calves is paid for calves killed between calving and the last day of November. The compensation for exceptionally large damage to reindeer, i.e. double the compensation for the reindeer found, is paid to reindeer herding cooperatives in which the number of damages in proportion to the number of reindeer exceeds the specified limit.

The amount of compensation paid for damages caused to livestock and other animals by a large carnivore is no more than the current value of the animal lost. Damage to a dog caused by a large carnivore may be compensated for if the dog was in controlled circumstances or was used in controlled circumstances, such as when hunting, herding or guarding. No compensation is paid for damage caused to a hunting dog during a hunt by the large carnivore being hunted.

However, every effort should be made to first and foremost prevent damage caused by large carnivores. In order to receive compensation, the party suffering the damage must be able to demonstrate that they have, by reasonable means, made an effort to prevent the damage. The Ministry of Agriculture and Forestry may grant a subsidy to cover any costs for preventing damage, such as for the procurement of materials.

2.2.4 HUNTING OFFENCES IN LEGISLATION AND INDICATIVE VALUE OF GAME ANIMALS

Minor hunting infractions are regulated in the Hunting Act (615/1993), whilst hunting offences and aggravated hunting offences are regulated in the Criminal Code (391/899). An amendment (232/2011) to the Criminal Code stipulates that any illegal killing of large carnivores will be treated as an aggravated hunting offence. The sentence for an aggravated hunting offence is always no less than four months' and no more than four years' imprisonment. In addition, any person found guilty of committing an aggravated hunting offence will be prohibited from hunting for no less than three years and no more than ten years. The amendment also gives the police the opportunity to use remote surveillance and the acquisition of SMS location data to enhance the investigation of hunting offences when conducting the preliminary investigation of an aggravated hunting offence or aggravated concealing of illegally killed game.

The indicative value of game animals was raised in 2010 in order to make the financial or other gains of committing a hunting offence less attractive[19]. Any person guilty of illegally killing a large carnivore may also be required to compensate the state for the game species in question in accordance with an indicative value specified in the Ministry of Agriculture and Forestry decree (241/2010). The amount of the compensation varies according to whether the individual was a juvenile or adult. The indicative value for wolverine is €5,500–€16,500, for lynx €1,100–€2,100, for bear €4,500–€15,500 and for wolf €4,500–€9,100.

[19] Ministry of Agriculture and Forestry decree on the indicative value of live game animals 2009.

3 EVALUATION OF THE POLICY ON LARGE CARNIVORES

3.1 ECOLOGICAL SUSTAINABILITY OF LARGE CARNIVORE POPULATION MANAGEMENT

In examining the ecological sustainability of large carnivore population management, the evaluation of threatened species of large carnivores, trends in large carnivore populations during the review period and bag limit adjustments were all taken into account.

3.1.1 CONSERVATION STATUS

As stated in section 2 of the Nature Conservation Act (160/1997): 'The Ministry of the Environment shall organise the monitoring of naturally occurring species and natural habitat types so as to establish their conservation status. Special priority shall be assigned to endangered species, priority species and habitat types referred to in the Directive of the Council of the European Community (92/43/EEC) on the conservation of natural habitats and of wild fauna and flora, hereinafter the Habitats Directive...' Based on this, large carnivores are taken into account in the monitoring of endangered species carried out under the supervision of the Ministry of the Environment. Table 4 shows Finland's report on enforcement of the Habitats Directive submitted to the Commission for the period 2007–2012 (see also section 2.1.5.).

A national conservation status assessment (Table 5), whose results were published in the Red List, was conducted for Finnish species using International Union for Conservation of Nature (IUCN) criteria. This conservation status assessment is based on the size of species populations as well as the extent of the range and any changes occurring therein. The causes and threats of the conservation status are also defined in the conservation status assessment. In a conservation status assessment, attention is given to population increases coming from outside a given country as well as populations living on either side of a national border. In previous conservation statuses, populations living in neighbouring countries and migrations from them were considered to reduce the risk of large carnivore loss in Finland. In a recent report, research results show that this is no longer considered to be the case; as a result, the conservation status of large carnivores is no longer reduced but it is directly based on the set criteria[20].

[20] Rassi, P., Alanen, A., Kanerva, T. & Mannerkoski, I. (toim.). 2001. Suomen lajien uhanalaisuus. Ympäristöministeriö & Suomen ympäristökeskus, Helsinki.; Rassi, P., Hyvärinen E., Juslén, A. & Mannerkoski, I. (toim.). 2010. Suomen lajien uhanalaisuus - Punainen kirja 2010. Ympäristöministeriö & Suomen ympäristökeskus, Helsinki.

Table 4. Finland's report on the enforcement of the Habitats Directive submitted to the Commission for the period 2007–2012. The overall assessment for a species' conservation status is made separately for boreal and alpine (Fell Lapland) regions.

	Boreal 2013					Alpine 2013				
	Range	Population	Habitat	Future	Overall assessment	Range	Population	Habitat	Future	Overall assessment
Wolf	FV	U1-	FV	XX	U1-	FV	U1	FV	XX	U1=
Wolverine	FV	U1+	FV	FV	U1+	FV	FV	FV	XX	FV
Lynx	FV	FV	FV	FV	FV	FV	FV	FV	XX	FV
Bear	FV	FV	FV	FV	FV	FV	FV	FV	FV	FV

FV = Favourable; **U1** = Unfavourable, inadequate; **U2** = Unfavourable, bad; **XX** = Unknown, not assessed
= Stable; **+** Improving; **-** Deteriorating; **x** Unknown

Table 5. Conservation status for large carnivores in 2001 and 2010.

	wolverine	lynx	bear	wolf
2001[21]	EN	NT	NT	EN
2010[22]	CR	VU	VU	EN
NT (Near Threatened)				
VU (Vulnerable)				
EN (Endangered)				
CR (Critically Endangered)				

WOLVERINE

In the last report on endangered species in Finland (published in 2010), the wolverine was classified as a critically endangered species (Table 5), which is subject to a very high risk of extinction in the wild without special measures being taken. The small overall size of the wolverine population was used as the criterion for this classification. According to the conservation status assessment, in a wolverine population of approximately 155 individuals, only 50 are capable of reproducing, which is the threshold value for the number of individuals of a critically endangered species that are capable of reproducing. The wolverine was formerly classified as endangered (Table 4). The reason for this change in classification is the interpretation, according to which there is no migratory influx of wolverine from outside Finland (assessment conducted in 2008-2009).

The causes behind the conservation status include illegal killing and disturbances caused by snowmobiles. These same factors are also considered key future threats. Climate change is seen as a new threat.

LYNX

In the last report on endangered species in Finland, the lynx was classified as a vulnerable species (Table 5), with a high risk of extinction in the wild. The size of the lynx population with reproductive capacity is estimated to be less than 1,000 individuals. Hunting is considered to be the main cause behind and threat to its conservation status. Other threats are its major dependence on fluctuations in the population of prey animals. Low prey animal populations may lead to an increased mortality rate for juveniles and decreased reproductive capacity. The lynx was classified in 2001 as near threatened (Table 5). The reason for this change in classification is the interpretation according to which there is no migratory influx of lynx from outside Finland (assessment conducted in 2008-2009).

The Finnish Game and Fisheries Research Institute estimated that there were 396-430 lynx litters in Finland in 2010. It is, however, difficult to determine the percentage of individuals with reproductive capacity in the lynx population that have not reproduced. According to an estimate made by the FGFRI, the 1,000-individual limit of lynxes with reproductive capacity had already been exceeded in 2010. According to the FGFRI, the lynx population in Southwest Lapland had received some migratory influx from the overall Scandinavian lynx population, which is approximately 2,500 individuals. In Northwestern Russia, the lynx population is small and migratory influx modest. There is no precise data on the migratory influx from the potentially key migration origin areas of Russian Karelia and Leningrad Oblast.[21]

BEAR

In the last report on endangered species in Finland, the bear was classified as a vulnerable species (Table 5), with a high risk of extinction in the wild. The bear population with reproductive capacity is estimated to be below 1,000 individuals. Hunting is considered to be the main cause behind and threat to its conservation status. The bear was classified in 2001 as near threatened (Table 5). The reason for this change in classification is the interpretation according to which there is no migratory influx of bear from outside Finland (assessment conducted in 2008-2009).

[21] Kojola Ilpo 2011: Suomen karhu- ja ilveskantojen lisääntymiskykyiset yksilöt ja immigraatio, Muistio 22.8.2011, RKTL

The Finnish Game and Fisheries Research Institute estimated that there were between 182-201 bear cub litters in Finland in 2010 and the number of individuals in the bear population with reproductive capacity is 900. This falls below the 1,000-individual conservation status limit for individuals with reproductive capacity. According to the FGFRI, the predominance of male bears taken in Kainuu and North Karelia suggests that there is a migratory influx of bear into Finland from Russia, although there is no precise data on this. The Finnish bear population is part of the overall European population, which is comprised of approximately 30,000 individuals.[22]

WOLF

The wolf was classified as endangered in both 2001 and 2010 (Table 5) and is subject to an extremely high risk of extinction in the wild. Population size is considered a conservation status criterion. In the wolf population at that time, which was comprised of approximately 150-185 individuals, there were less than 250 individuals with reproductive capacity, which is the threshold value for the number of individuals of a critically endangered species that are capable of reproducing. Hunting is considered to be the main cause behind and threat to its conservation status.

3.1.2 POPULATION TREND DURING THE REVIEW PERIOD

The monitoring of large carnivore populations is based on observations recorded and reported by local large carnivore contact persons. These national evaluations of large carnivore populations were started by the Ministry of Agriculture, Reindeer Herders' Association, Finnish Border Guard, Finnish Game and Fisheries Research Institute and Finnish Wildlife Agency (formerly Hunters' Central Organisation) in 1978. In Finland, there are currently some 2,000 local large carnivore contact persons, the majority of whom belong to game management associations. A number of Metsähallitus field personnel, reindeer herders and border guards also assist in the observation of animal tracks. Local residents report any observations made to the local large carnivore contact person, who then forward these observations via the online Tassu system to the FGFRI, which makes the minimum annual population estimate for large carnivores based on observations and local censuses. Population estimates of the number of animals are primarily based on litter observations, which are analysed using location data applications. This makes it possible to compare the dispersal and habitat size of a species with observation dates, thus eliminating any double counting. Tassu was updated in November 2013.

The minimum population estimates presented in this evaluation are based on FGFRI statements submitted to the Ministry of Agriculture and Forestry[23].

WOLVERINE

Issued at the end of each year, the minimum population estimate for wolverine is based on confirmed observations made by local large carnivore contact persons of both wolverine individuals and litters. Jointly carried out by Metsähallitus and the Reindeer Herders' Association, the annual snow track census of wolverine in principal occurrence areas play a key role in monitoring the wolverine population in Fell Lapland. There are six areas in all, three of which undergo a census during a single winter. The areas are the Käsivarsi Wilderness Area, Urho Kekkonen National Park, Muotkatunturi Wilderness Area, Eastern Inari and the Pulju and Pöyrisjärvi Wilderness Areas. A separate census is also undertaken approximately every other year in the western Lapland Palojärvi reindeer herding cooperative area, where special attention is given to the charting of lynx observations instead of wolverine observations.[24]

Finland's northern wolverine subpopulation is shared with Sweden and Norway, and there are no geographical obstacles to impede the free dispersal of wolverine across the national borders. Population estimates are, however, made using different methods. In Norway, the overall estimate of the wolverine population is based on verified presence of wolverine, whilst estimating the size of the overall wolverine population is based on the minimum rate of successful reproduction over the past three years[25]. In Sweden, estimating the size of the wolverine population is based primarily on confirmed presence of wolverine and, secondarily, on other wolverine observations[26].

[22] Kojola Ilpo 2011 Suomen karhu- ja ilveskantojen lisääntymiskykyiset yksilöt ja immigraatio, Muistio 22.8.2011, RKTL

[23] RKTL:n lausunnot suurpedoista <http://www.rktl.fi/riista/suurpedot/rktln_lausunnot_suurpedoista.html>

[24] Statement ylitarkastaja Tuomo Ollila, Metsähallitus, 25.11.2013

[25] Brøseth, H. & Andersen, R. 2007. Yngleregistreringer av jerv i Norge i 2007. – NINA Rapport 295.

[26] Viltskadecenter 2006. Resultat från inventeringar av järv i Sverige 2006.

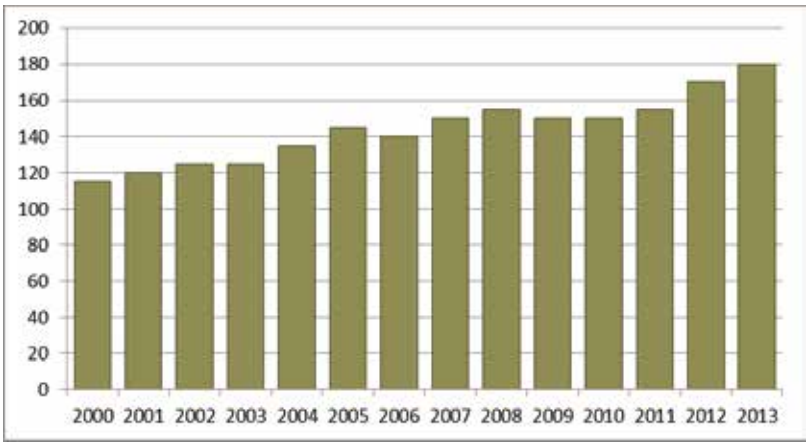

Figure 3. Minimum population estimate for wolverine 2000-2013.

According to the minimum population estimate for wolverine, population growth has been very moderate (Figure 3) and does not correspond to the predicted reproduction potential. As there is no valid population management plan in place for wolverine, it was not possible to evaluate the success of measures taken in relation to the objectives set for them in the population management plan. However, it should be kept in mind that the wolverine population is divided into two subpopulations – the northern wolverine and eastern wolverine – which show signs of a bottleneck effect. Approximately 50% of Finland's wolverine population is found in the reindeer husbandry area. In 2013, this was approximately 80-90 individuals. Approximately 50-60 individuals of the eastern wolverine population are found in eastern parts of Finland and 20-30 in central parts of Finland, in the Suomenselkä area.[27]

Despite the overall estimate of the existing wolverine population, it must be noted that, particularly where the eastern wolverine subpopulation is concerned, wolverine observations are extremely infrequent and real data on individual counts and population trends are difficult to produce. There are also great difficulties in estimating the wolverine population in the reindeer husbandry area.

LYNX

The minimum population estimate for lynx is made each autumn prior to the hunting season. The estimate is made using a method in which data based on the random observation of lynx litters made during the autumn of the previous year as well as the winter and spring of that year is used to calculate the estimated number of individuals. Estimates are based on lynx litter observations made by local large carnivore contact persons during the review period (1 September–30 April) and local censuses made by the Finnish Wildlife Agency, game management associations and the FGFRI that are based on snow track counts. At least two visual and/or track observations reported by a local large carnivore contact person via the Tassu system during the review period are always counted as litter observations. Observations are subjected to a separate analysis in which any double counts are eliminated. Litters verified in the regional censuses (excluding border litters), are included as such in the estimate.[28]

Regional censuses were undertaken in the Kainuu game management district in 2008 and in Western Uusimaa in 2010. In the winter of 2011-2012, censuses were made in Eastern Uusimaa, South and North Savo, Central Finland and Satakunta, and in the winter of 2012-2013 in Southeast Finland, South Häme, Southwest Finland and Kainuu. In the winter of 2013-2014, local censuses were made in, for example, Ostrobothnia, coastal Ostrobothnia and North Häme.[29]

The following population growth objectives are set for each management area in the lynx population management plan:

- *The objective is not to increase the lynx population in the reindeer husbandry area, but to ensure the free dispersal of lynx between Scandinavia and Russia.*

[27] Koskela Anni 2013: Wolverine habitat selection, diet and conservation. Väitöskirja, Genetics acta universitatis ouluensis; a scientia e rerum naturalium 614.

[28] The methods of population estimation of lynx <http://www.rktl.fi/riista/suurpedot/ilves/ilveksen_kanta_arvioinnin/>

[29] The methods of population estimation of lynx

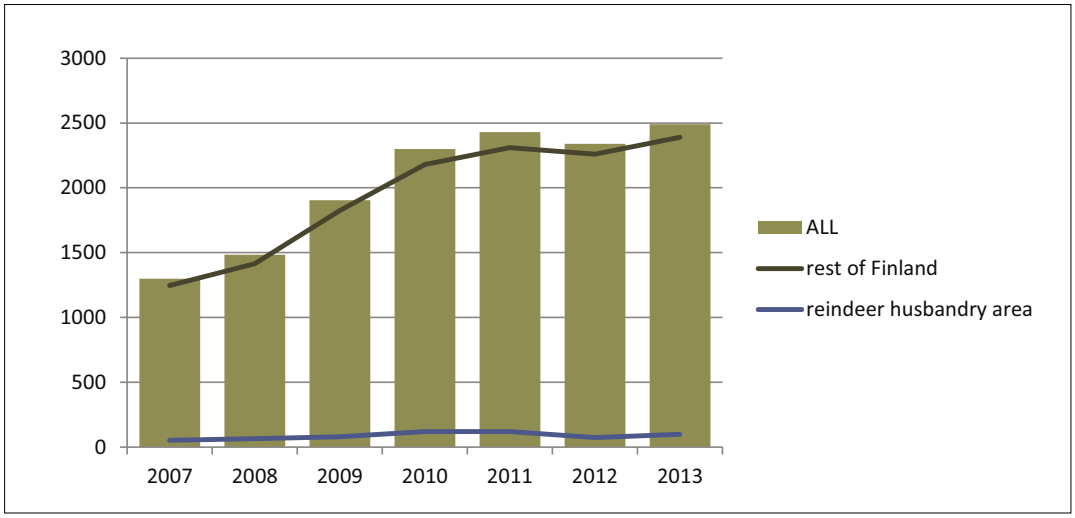

Figure 4. Lynx population growth in 2007-2013 by population management area and throughout Finland. The minimum population estimate is made prior to the hunting season and includes individuals older than one year.

- *In management areas outside the reindeer husbandry area, the objective is to establish a lynx population that allows natural dispersal and range expansion in harmony with special regional features.*

- *Growth of the lynx population is to be limited, especially in areas where there is a high population density, taking into account the principle of sustainable use and the objective of achieving a more even distribution of the lynx population.*

In examining the population growth of lynx (Figure 4), it can be seen that the minimum population estimate for lynx has increased by over one thousand individuals during the review period, with approximately 2,390 individuals outside the reindeer husbandry area in 2013. One might consider that the objective of establishing a lynx population outside the reindeer husbandry area and range expansion in harmony with special regional features has been achieved. Within the reindeer husbandry area, the lynx population has increased from the starting point of the review period, which does not correspond to the objective stated in the population management plan. Approximately 4% of the overall lynx population is found within the reindeer husbandry area, which suggests that the lynx is also able to disperse between Scandinavia and Russia. During the period 1998–2012, the annual growth rate for lynx calculated from the minimum population estimate for the entire country ranged between 2 and 28%[30]. This high rate of growth occurred during the period 2008-2010 both within and outside the reindeer husbandry area. An effort has been made to limit the growth of the lynx population in high density areas by hunting. This is discussed in greater detail in section 2.3.3.

Analysis of the population level shows that the lynx population is healthy. During the review period, the lynx population experienced dramatic growth, whilst dispersing out into new areas.

BEAR

The minimum population estimate for bear is made each year in the spring or early summer. The estimate is based on bear cub litter observations made during the summer of the previous year. Distance criteria, observation dates and data on the number of bear cubs and the size of the female's paw are used to estimate the number of different litters. Distance criteria are based on data obtained from a GPS transmitter affixed to a female with cubs, showing their dispersal and habitat size. An estimate of the overall number of individuals is made by multiplying the number of cubs by ten. Bear population estimates for Western and Southern Finland also place a focus on observations of bear individuals, because litters in these areas are rare and the bear population is mainly comprised of ju-

[30] Forecast on the growth of lynx population to 2015 – description of the forecast model <http://www.rktl.fi/www/uploads/pdf/Riista/ennustemallin_kuvaus_ilves.pdf>

venile males.[31] In bear population estimates for the reindeer husbandry area, attention is also given to the lower number of observations resulting from a more sparse observation network and vast wilderness areas that do not have the same road network as found elsewhere in Finland.

Genetic techniques in estimating population have become common. Faecal DNA sampling provides data for estimating the number of individuals. The DNA material can also be used to identify the gender of individuals, which is extremely important in determining the structure and reproductive potential of a population. Due to the large resources involved, genetic techniques will not replace observation data, but they can be compared to it. Three follow-up DNA-based bear population studies were conducted in a few areas in 2007, 2009 and 2011.

The following population growth objectives are set for each population management area in the bear population management plan:

- *The number of individual bears (in the reindeer husbandry area) will be kept at current levels. To balance the natural range regionally, implement a more detailed regional hunting bag plan and ensure that there is migration between the separate populations in north-eastern Europe and Scandinavia, the reindeer husbandry area should continue to be examined in terms of a western and eastern reindeer husbandry area when taking decisions on population control. To ensure that there is a more even dispersal, the need to divide the area up into smaller management areas will be looked into.*

- *The number of bears in the management area with an established population is not to be increased.*

- *The number of bears in the dispersal zone will be allowed to grow moderately to ensure that the bear population disperses into the management area for a developing population.*

- *The number of bears in a management area with a developing population will be allowed to increase.*

The bear population for all of Finland showed dramatic growth during the period 2008-2011, with the highest minimum population estimate for bears over one year old being approximately 1,660 individuals. Since that time, the bear population has decreased, with approximately 1,255 individuals reported in 2013 (Figure 5). Upon examination of the population level, it can be said that the bear population is healthy. During the review period, the bear population has increased in Finland, gradually dispersing into new areas.

The growth in the bear population (Figure 5) reveals that the objective of maintaining the bear population within the reindeer husbandry area at 2006 levels was not entirely achieved. Although the size of the bear population increased by approximately 300 individuals in 2009-2011, it returned to the same level as reported at the beginning of the review period. Approximately 20% of Finland's entire bear population is found within the reindeer husbandry area. As opposed to the objective set in the population management plan, separate population estimates for eastern and western reindeer husbandry areas were not made in 2008 and 2010-2012. As a result, it was not possible to estimate the more even distribution of bear numbers.[32] Together with representatives from reindeer husbandry and the FGFRI, the Ministry of Agriculture and Forestry has explored the need to divide the reindeer husbandry area into, for example, four population management areas, but this measure was not considered necessary in situations where derogations on a population management basis for bear had not been used for several years and derogations on a damage basis were, for the most part, unnecessary.[33]

In the management area with an established population, the number of bears rose to its highest level in 2010-2011 since implementation of the population management plan.

The objective of a moderate increase in the number of bears within the dispersal zone has not been realised, with the bear population nearly doubling from 240 to 470 individuals during the review period. This growth has also led to the formation of regional bear densities.

In the management area with a developing population, the increase in the bear population has been moderate and reasonably slow due to the slow influx of female bears.

[31] The methods of population estimation of bear <http://www.rktl.fi/riista/suurpedot/karhu/karhun_kanta_arvioinnin/>

[32] Statement Ilpo Kojola 24.11.2013

[33] Statement Jussi Laanikari 2.12.2013

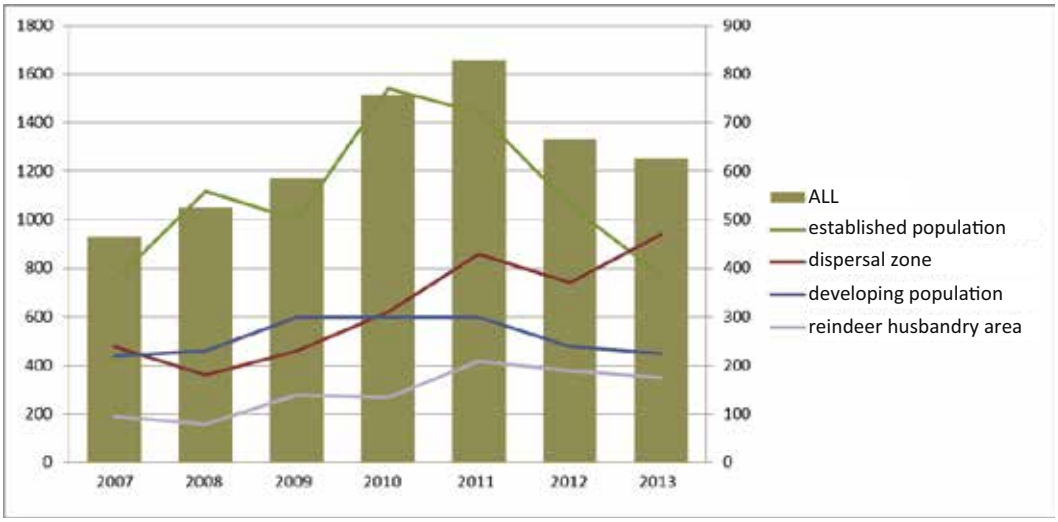

Figure 5. Growth in bear population during the period 2007-2013 throughout Finland (axis 1y) and by population management area (axis 2y). The minimum population estimate is made prior to the hunting season and includes individuals older than one year.

WOLF

The minimum population estimate for wolf is made each year in January-February. The estimate is based on snow track observations. A picture of the current wolf pack numbers is established based on observation data, GPS tracking and the territorial behaviour of wolves. The number of individuals in a pack is determined using snow tracks. Estimating the wolf population is further defined by means of regional censuses, in which hunters and nature actors work together with FGFRI researchers to determine the number of wolves in a specified area on one day.[34] Wolves have been collared since 1998. A total of 140 wolves have been collared since March 2013.

The following population growth objectives are set for each population management area in the wolf population management plan:

- *The objective is not to increase the wolf population within the reindeer husbandry area. The aim is to ensure the dispersal of wolves between Scandinavia and Russia.*

- *There is no need to increase the wolf population in the Eastern Finland population management area. Another objective for the Eastern Finland population management area is a more even distribution of the wolf population within the management area. Human population density and economic structure are taken into consideration in the growth of the wolf population.*

- *In the Western Finland population management area, the objective is the dispersal of the wolf population and range expansion, whilst taking human population density and economic structure into consideration.*

After the population management plan entered into effect, the wolf population for the entire country reached its peak in 2007, but has declined since then. A major collapse in the wolf population occurred in 2010, when the minimum population estimate decreased from 215 individuals in the previous year to 142 individuals. The lowest population level—approximately 120 individuals—was reported in 2013.

Growth in the wolf population (Figure 6) shows that the objective of maintaining population levels within the reindeer husbandry area was realised. The wolf population within the reindeer husbandry area has varied each year, with 10-20 individuals reported in the early winter of the review period. The exception to this was the autumn of 2009, when there were approximately 40 individuals within the reindeer husbandry area at one point. During the winter, some of these wolves were hunted under a derogation due to damages to rein-

[34] The methods of population estimation of wolf <http://www.rktl.fi/riista/suurpedot/susi/suden_kanta_arvioinnin/>

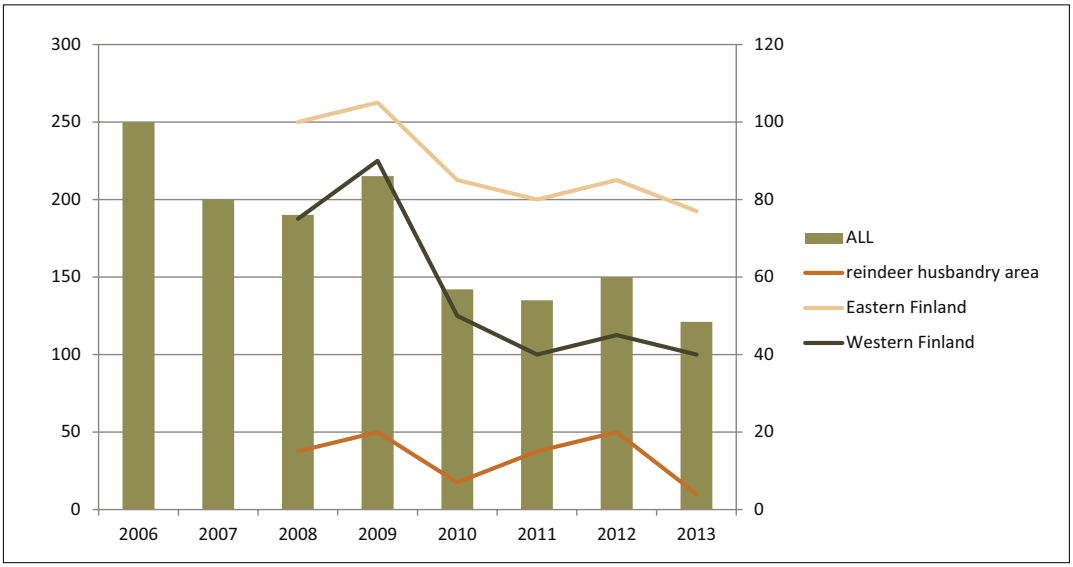

Figure 6. Growth in the wolf population growth during the period 2006-2013 throughout Finland (axis 1y) and by population management area (axis 2y) in 2008–2013. The minimum population estimates are made in February-March of the year in question.

deer stock. However, wandering juvenile wolves are free to disperse into Scandinavia, particularly when there is no snow cover. This is also proven to be the case.[35] In the summer months, wolves disperse from the southern reaches of the reindeer husbandry area to the west and up the coastline to Sweden. Juvenile wolves are also able to wander to the west straight through the reindeer husbandry area, as their observation and detecting any damages they cause during summer months are, in practice, marginal compared to the winter months. Thus, it can be said that the dispersal of wolves between Scandinavia and Russia is ensured.

The Scandinavian wolf population suffers from inbreeding and needs gene flows from Russian and Finnish wolves[36]. A reduction in inbreeding over the long term can be ensured by recruiting one eastern wolf each year and integrating it in the Scandinavian population. According to researchers, at least one or two wolves wander from Finland to Sweden each year. In the period 2002-2009, a total of 12 wolves wandered into Sweden, but only two of these reached the core area of the Scandinavian wolf population and were able to mate.[37] The most recent migration of wolves from Finland to Sweden occurred in the winter of 2013, when a pair of wolves crossed the Tornio River into Sweden. In February 2013, these wolves were transferred by vehicle to Central Sweden, where they had already mated in the spring of 2013. In negotiations with Swedish authorities, the Ministry of Agriculture and Forestry promoted the transfer of adult wolf individuals from the Finnish reindeer husbandry area directly to Sweden's wolf mating area in order to enhance the genetic diversity of the Scandinavian wolf population. Even though Finland has the capabilities to assist Sweden in this matter, Sweden has yet to request any practical implementation measures.

The objective of preventing an increase in the current wolf population in the Finnish reindeer husbandry area was achieved, but a significant drop in the wolf population suggests that the objective of an even population distribution was not achieved. The objective for the Western Finland population management area, i.e. the distribution of the wolf population and expansion of the range, was not achieved as the number of wolves showed a dramatic decline during the review period.

[35] Naturvårdsverket, Statens Jordbruksverk & Statens Veterinärmedicinska Anstalt, 2010: Genetisk förstärkning av den svenska vargstammen – Svar på uppdrag om rutiner för införsel och utplantering av varg i Sverige.

[36] Räikkönen ym. 2013: What the Inbred Scandinavian Wolf Population Tells Us about the Nature of Conservation.

[37] Naturvårdsverket ym. 2010

3.1.3 BAG LIMIT ADJUSTMENTS

The preconditions of bag limit adjustments are discussed in greater detail in section 2.2.2. The procedure for granting derogations has changed during the review period for this evaluation. Derogations were granted by the Ministry of Agriculture and Forestry until 31 July 2008, by game management districts during the period 1 August 2008–28 February 2011 and the Finnish Wildlife Agency from the beginning of 1 March 2011. Derogations for large carnivores are granted either on a population management basis or a damage basis.

The Government Decree on Derogations Laid down in the Hunting Act (452/2013) specifies the terms and requirements for derogations. As stated in the Decree: '...that the names of the persons participating in the hunt must be notified to the police of the area before initiating the hunt and the police must be separately notified of every start of the hunt and the hunting area. If the hunt takes place in the border zone or close to this, the Finnish Border Guard must also be notified of the start of the hunt and the hunting area...' The person to whom a derogation is granted must notify the Finnish Wildlife Agency and the police of the hunted wolverine, lynx, bear, otter and wolf on the first weekday after the day when a game animal referred to in the derogation has been captured or killed or, if the game animal has not been captured or killed, after the day when the derogation expires. In accordance with the Decree, which entered into effect in June 2013, the derogation may be granted for a period of no more than 21 days. During the review period of this evaluation, the period of validity for a derogation was 14 days, in accordance with the Government Decree on Derogations Laid down in the Hunting Act (169/2011), which entered into effect on 1 March 2011. According to the Hunting Act, any large carnivore captured or killed is the property of the state.

FGFRI statements on large carnivore numbers and sustainable bag limit adjustments are key references used by the Ministry of Agriculture and Forestry when issuing decrees on the maximum number of permitted licenses. The FGFRI issues statements on bag limit adjustments upon request. It has issued a total of 29 such statements during the period 2007-2012.

Large carnivores displaying abnormal behaviour and posing a safety threat are primarily eliminated in accordance with section 16 of the Police Act (formerly section 25), whenever necessary. This involves situations that are increasingly threatening and pose a serious hazard to human life, health or property in which there is no time to determine the application requirements of the Hunting Act or Decree. Under such statutes concerning cases involving police discretion, a total of 22 lynxes, 25 bears and 17 wolves were killed during the period 2007-2012 (Figure 7). In 2010, the wild berry yield was extremely poor, thus resulting in a large number of bears visiting peoples' gardens for food. The high number of lynxes taken (9 individuals) during the 2012-2013 hunting season was due to a police

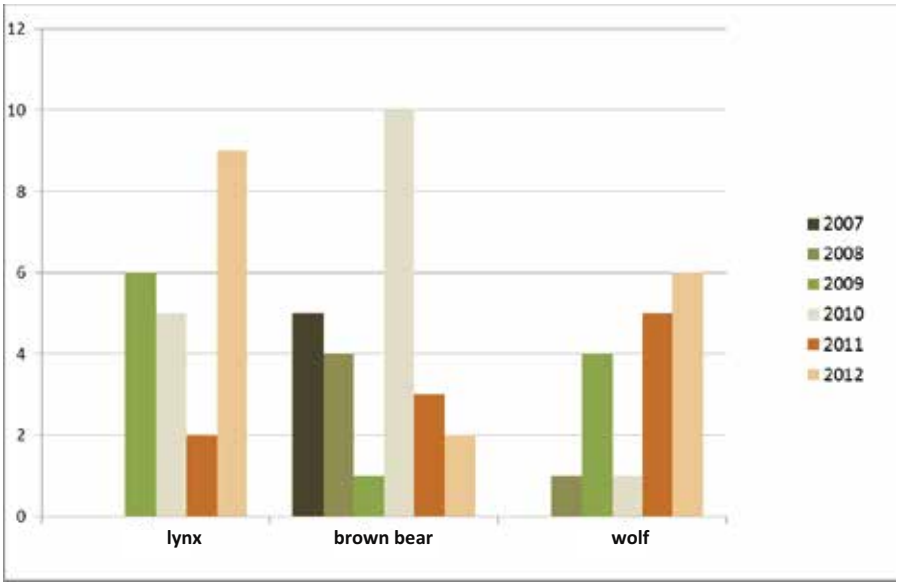

Figure 7. Lynx, bear and wolf killed under section 16 (formerly section 25) of the Police Act during the 2007-08 and 2012-13 hunting seasons.

order to put down six individuals, which were in poor physical condition/starving. Lynxes rarely pose an actual safety threat.

WOLVERINE

No derogations have been granted for the wolverine since it was first protected in 1982. With the exception of Fell Lapland, the conservation status for wolverine is listed as unfavourable (Table 4). The granting of derogations under section 41 of the Hunting Act for hunting wolverine in high density areas is possible within the framework of the Hunting Act and Decree on Derogations, provided that there is no satisfactory alternative and the conservation status of wolverine will not be jeopardised in the dispersal zone. However, the granting of derogations was not, in practice, possible within the context of the wolverine population management plan and the Ministry of Agriculture and Forestry decree on maximum permitted hunting limits. Considering the current wolverine population situation, the granting of derogations is complicated. If derogations were to be granted for wolverines killing a large number of reindeer, older and more experienced wolverines, which are generally more skilled predators than juveniles, would also be targeted. In this case, it is possible that the viability of a small wolverine population would be threatened over the long term. On the other hand, wolverine females kill a large number of reindeer in early spring to ensure the success of their litters. The taking of females from the wolverine population, which is slow to reproduce, without jeopardising the possibility for population growth is risky from an ecological standpoint. In Sweden and Norway, wolverines are covered by derogations, and in Norway there is a normal hunting season for wolverine.

LYNX

The Finnish Wildlife Agency grants derogations on a population management and damage basis for lynx based on applications and comprehensive consideration, within the maximum permitted bag limit set by Ministry of Agriculture and Forestry decree (see section 2.2.2.). From the 2013-2014 hunting season there have been no limits on derogations based on damage, but before that a maximum limit was set for such derogations during the review period. Derogations granted on a population management basis focus on areas with the highest density of lynx, whilst derogations on a damage basis are reserved for special situations, such as major damage caused to reindeer husbandry[38].

The following population growth objectives are set for each population management area in the lynx population management plan:

- *Growth of the lynx population is to be limited, especially in areas where there is a high population density, taking into account the principle of sustainable use and the objective of achieving a more even distribution of the lynx population.*

The definition of the minimum lynx population estimate also defined the amount of growth in the lynx population, and the Ministry of Agriculture and Forestry has in recent years allowed for a more extensive hunting of lynx under derogations on a population management basis (Figure 8).

Bag limit adjustments have not yet been able to stop the growth of the lynx population in high density areas. The slow response of the lynx population to bag limit adjustments, which were put in place to slow down population growth, suggests that determination of the lynx population had not been up-to-date in the 2000s. The FGFRI has developed a forecast model to help in making decisions on lynx population management[39]. The model is used to forecast how different hunting bag percentages (10, 16 and 20%) affect the growth of the lynx population. The model was used for the first time during the 2012-2013 hunting season, when a hunting bag percentage of 16% was used in other areas of Finland to provide a stable population model for forecasting population growth. As not even this hunting bag percentage was sufficient to decrease the population, the hunting bag percentage for other population management areas of Finland was raised to 22% for the 2013–2014 hunting season[40].

The high utilisation rate of derogations on a population management basis (Figure 8) suggests that the scaling of these derogations is headed in the right direction. A larger number of derogations on a population management basis being aimed at areas with a high density of lynx could have achieved a higher derogation utilisation rate.

[38] The methods of population estimation of lynx < http://www.rktl.fi/riista/suurpedot/ilves/ilveksen_kanta_arvioinnin/>

[39] Forecast on the growth of lynx population to 2015 – description of the forecast model <http://www.rktl.fi/www/uploads/pdf/Riista/ennustemallin_kuvaus_ilves.pdf>

[40] Maa- ja metsätalousministeriön asetus poikkeusluvilla sallittavasta Ilveksen metsästyksestä metsästysvuonna 2013—2014, Muistio 26.6.2013

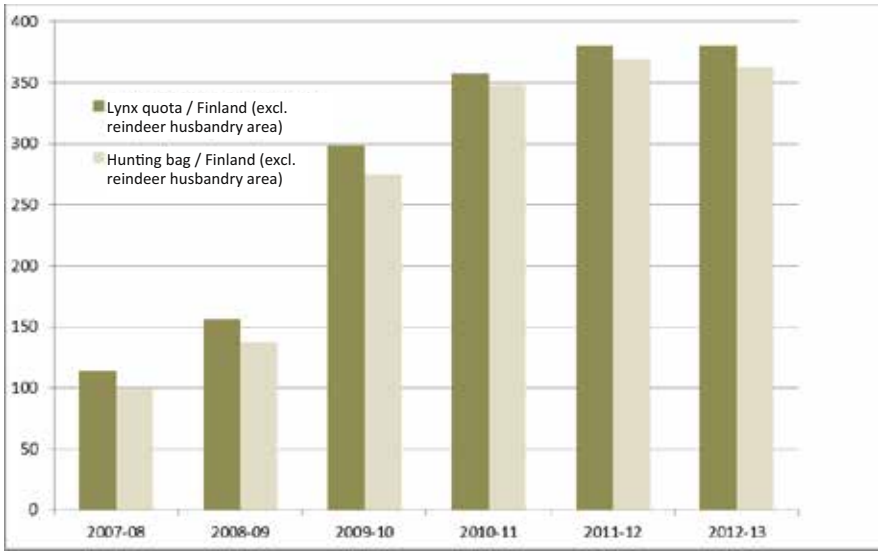

Figure 8. Derogations on a population management basis granted for lynx and the hunting bag in Finland (Ex. reindeer husbandry area) during the 2007-08 and 2012-13 hunting seasons.

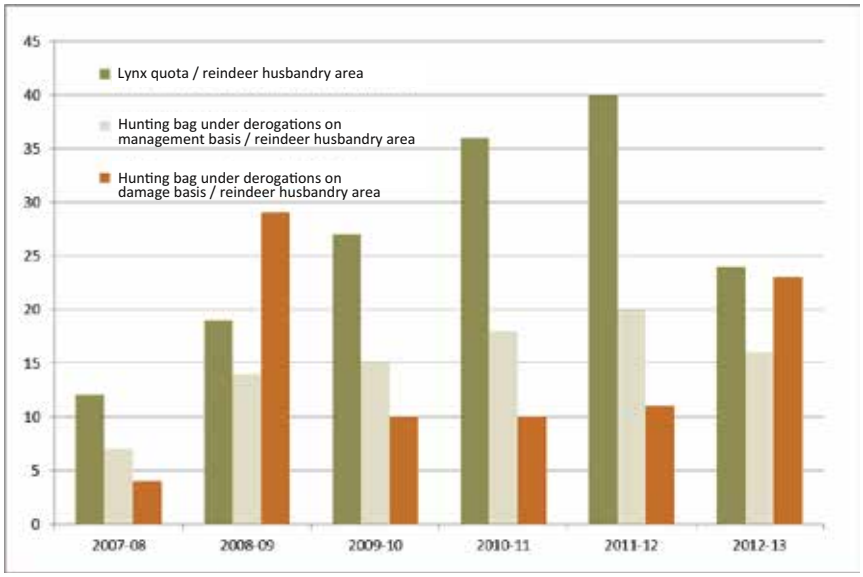

Figure 9. Derogations on a population management basis granted for lynx and the hunting bag under derogations on a management basis as well as the hunting bag under derogations on a damage basis within the reindeer husbandry area during the 2007-08 and 2012-13 hunting seasons.

During the review period, the lynx population in only two areas — North Karelia and Kainuu — had decreased, approaching the national average. At the beginning and end of the review period, North Savo had the highest density of lynx in Finland. According to the population estimate for the area, the number of individuals increased by 130. It should be noted that the population began to decline during the 2012-2013 hunting season. On the other hand, the moderate rate of lynx population growth in South Häme during the review period increased exponentially by approximately 85 individuals within one year in the 2012-2013 hunting season. The recent rise in the population estimate shown in the regional local censuses made in the winter of 2011-2012 and 2012-2013 is explained by the more precise data on the number of lynx cubs.

In other population management areas of Finland, only a few derogations on a damage basis were granted during the review period each year for the killing of lynx causing damage. For example, in the 2011-2012 hunting season, six derogations on a damage basis were granted (nine applications were submitted) for other areas of Finland, resulting in the taking of one lynx. During the 2012-2013 hunting season, four derogations on a damage basis were granted (seven applications were submitted), resulting in the taking of one lynx.

Within the reindeer husbandry area, the lynx population has remained moderate, although it did increase during the review period (Figure 4). The utilisation rate of derogations on a population management basis has remained very low (Figure 9). The annual number of individuals killed under derogations (on a population management and damage basis combined) averaged around thirty (ranging between 11-43). Approximately half of these were killed on population management basis, but the ratios of individuals taken under derogations on a population management and damage basis has varied from year to year (Figure 9). Granted and used derogations suggest that bag limit adjustments have not been an obstacle to achieving the population management plan objectives within the reindeer husbandry area. However, more effective utilisation of granted derogations could have contributed to the objective so that the lynx population would not have increased beyond its baseline level within the reindeer husbandry area.

BEAR

Derogations on a population management basis were granted for bear within the maximum permitted bag limit set by Ministry of Agriculture and Forestry decree, using the same criteria as for lynx. Derogations are granted by the Finnish Wildlife Agency at their discretion (see section 2.2.2.).

In accordance with the Government Decree on Derogations Laid down in the Hunting Act (452/2013), separate quotas for the eastern and western areas set by the Ministry of Agriculture and Forestry must be observed when hunting bear within the reindeer husbandry area. Any bear killed during hunts in the area in question must be immediately reported to the Finnish Wildlife Agency (earlier the Lapland game management district). Quota and hunting results are examined separately for the eastern and western reindeer husbandry area. The hunting bag has mostly been in line with limits set in Ministry of Agriculture and Forestry regulations and decrees since the 2009-2010 hunting season. In the 2010 autumn hunt, quotas were increased and the hunting bag rose to 55 bears, but since then, the hunting bag has fallen far below the set quota (Table 6). This drop in the hunting bag correlates with the decline in the number of bears (Figure 5).

The decline in bear numbers within the reindeer husbandry area can partly be seen in the lower incidence of damages to reindeer caused by bear (see section 3.2.2). On the other hand, after the Game Animal Damages Act (105/2009) entered into effect, the number of reindeer calves killed by bear were not reported to the same extent as before the Act[41]. The problem with the correlation between the bear population estimate, hunting bag and damages may also be that the bears may have dispersed across the Russian border before hunting season, only to return to Finland during the reindeer calving season.

[41] Statement Harri Norberg 5.12.2013

Table 6. Bear quota and hunting bag within the reindeer husbandry area during the 2007-08 and 2012-13 hunting seasons.

Bear quota	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
- quota/reindeer husbandry area	34	26	42	60	60	40
- quota/western reindeer husbandry area	8	6	12	15	15	10
- quota/eastern reindeer husbandry area	26	20	30	45	45	30
- hunting bag/reindeer husbandry area	33	26	42	55	33	30
- hunting bag/western reindeer husbandry area	7	6	12	12	6	8
- hunting bag/eastern reindeer husbandry area	26	20	30	43	27	22

Together with representatives from reindeer husbandry and the FGFRI, the Ministry of Agriculture and Forestry has explored the need to divide the reindeer husbandry area into four population management areas, for example, but this measure was not considered necessary in situations where derogations on a population management basis for bear had not been used for several years and derogations on a damage basis were, for the most part, unnecessary[42].

Bag limit adjustments have been used in an effort to address the bear population, which saw explosive growth during the period 2007-2010 in the area with an established population. As hunting bags during the 2007-08 and 2008-09 hunting seasons achieved the set quota in Finland (excluding the reindeer husbandry area), the quota for derogations on a population management basis was raised considerably for the next three hunting seasons (Figure 10). This led to a significant population decrease in the area with an established population, thus achieving the objective set in the population management plan. Instead, the population in the dispersal zone has shown a very sharp increase, contrary to the objective specified in the population management plan (Figure 5). With regard to the bear, there is a situation where there is no desire to use all available derogations on a population management basis within the area with an established population. This suggests that responsibility for bear population growth is being assumed and, consequently, there is a feeling of regional ownership for bear.

WOLF

Only derogations on a damage basis were granted for wolf in accordance with the Ministry of Agriculture and Forestry decree, maximum permitted bag limits and other restrictions specified in the decree. The Ministry of Agriculture and Forestry

[42] Statement Jussi Laanikari 2.12.2013

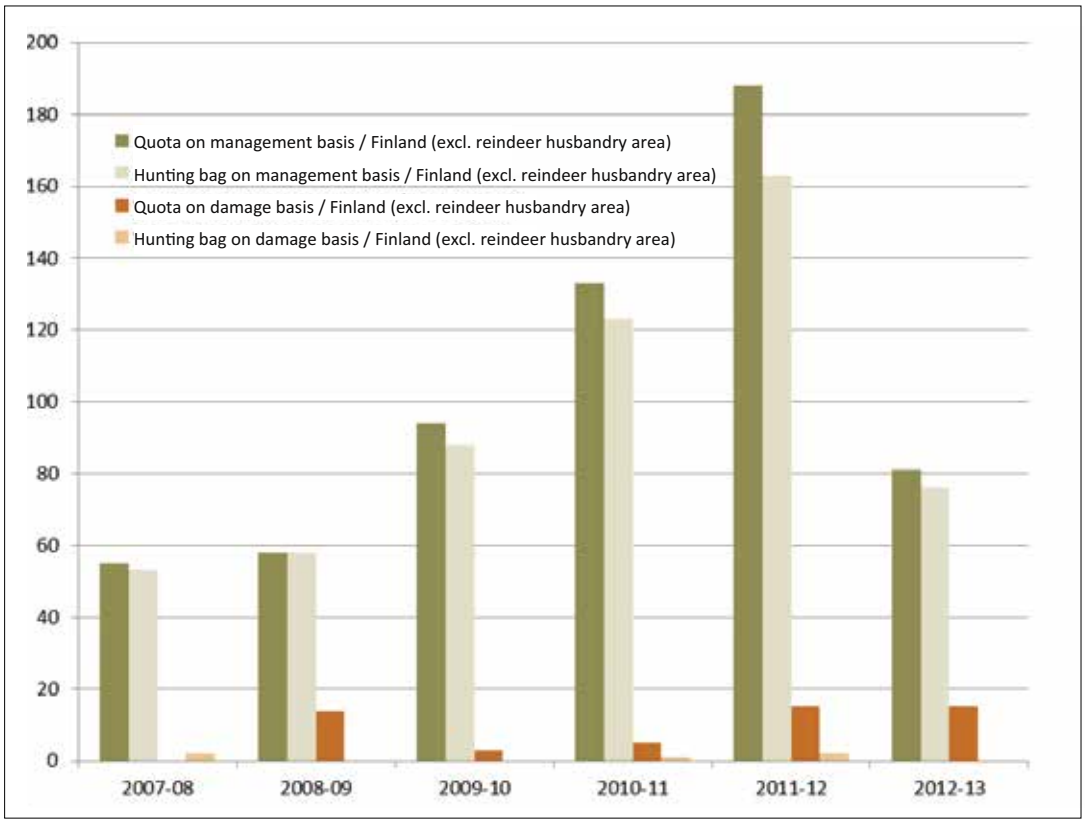

Figure 10. Quotas for derogations on a population management basis for bears (maximum permitted hunting bag) and number of individuals bagged; and derogations on a damage basis and number of individuals bagged in Finland (excl. reindeer husbandry area) during the 2007-08 and 2012-13 hunting seasons. Annual quotas and the number of individuals bagged are presented in Table 6.

transferred the authority to grant derogations for wolf to game management districts, beginning on 1 August 2008. This authority was then transferred to the Finnish Wildlife Authority on 1 March 2011, at which time wolves were also protected within the reindeer husbandry area.

For the first time since the introduction of the 2001 licence requirement for wolf hunting in the reindeer husbandry area, the Ministry of Agriculture and Forestry did not limit the number of derogations granted within the reindeer husbandry area for the 2012-2013 hunting season. This was due to the fact that the maximum permitted hunting bag from the previous year was quickly filled in the reindeer husbandry area and several hundred thousand euros in reindeer damages were incurred in the eastern reindeer husbandry area before the decree on this entered into effect. It was also decided to discontinue issuing decrees that are applicable to only one hunting season, because there are several months between the end of the hunting season (31 July), due to the late completion of the population estimate (early October), and the issuing of the decree (early November). During this time, there is no authority to handle any derogations on a damage basis or address all security threats. This amendment applies to the period 2013-2016.[43]

Because the wolf population was not managed by means of derogations on a population management basis, all wolf hunting is to be carried out under derogations on a damage basis. This can be seen in the large number of applications for derogations submitted compared to that for lynx and bear (Table 7). Despite the large number of applications, not very many derogations were actually granted. It should be noted that the number of derogations granted recurs with several consecutive derogations for the same individuals. Therefore, the number of derogations granted (Table 7) does not indicate the number of wolf individuals targeted. Particularly within the reindeer husbandry area, several consecutive derogations have been granted to the same areas, because wolf individuals causing damages are not killed within the 14-day period specified in the derogation. The derogation process is discussed in greater detail in section 2.2.2.

Only a handful of wolves have been bagged outside the reindeer husbandry area. The number of derogations applied for indicates the need and desire to influence the number of wolves in one's own area. Rejected applications indicate divergent views of the large carnivore policy and the field on what must be done regarding wolves in the area. Rejected applications also indicate that the reporting section of the application is not being duly completed. The low number of individuals bagged indicates that the terms for granting derogations have been too strict for the given situation. If a derogation is deemed necessary by game administration but no hunting bag is gained, there is good reason to come up with more flexible operating approaches, from fast-track decision-making to the hunt itself. On the other hand, a granted derogation can serve to calm derogation applicants, even if there is no hunting bag.

Within the reindeer husbandry area, the use of another satisfactory solution, such as expelling wolves causing damage, will not succeed in preventing this damage because wolves that have learned to kill reindeer will most likely return to their habitat or disperse to another area to prey on them. As semi-domesticated reindeer graze freely in nature, it is practically impossible to prevent damage to reindeer caused by wolves in a way other than by eliminating them. As a result, a large number of derogations have been granted for the reindeer husbandry area in order to prevent financial losses. Hunting pressure has contributed to keeping the wolf population in the reindeer husbandry area at a moderate level.

In the rest of Finland, 26 derogations (Table 7) were granted for the 2007-08 hunting season, with a total of 19 wolves being bagged. At that time, the wolf population was at its highest level and no sharp decreases were expected to occur in the future. Since that time, the quotas for derogations on a damage basis have varied from year to year, in an effort to respond to changes in the population size. Although regulations and decrees concerning maximum permitted hunting bags are generally issued for the entire country, no separate maximum permitted hunting bag was set for the reindeer husbandry area in the 2012-13 hunting season – instead, the limit was set for the rest of Finland. In recent years, consideration has also been steered by a decline in the social tolerance of the wolf. Derogations have been used in an effort to respond to wolf problems encountered in the given areas.

[43] Maa- ja metsätalousministeriön asetus poikkeusluvalla sallittavasta Suden metsästyksestä poronhoitoalueen ulkopuolella metsästysvuosina 2013—2016, Muistio

Table 7. Derogations on a damage basis applied for and granted in the reindeer husbandry area and in the rest of Finland; and number of individuals bagged under derogations granted during the 2007-08 and 2012-13 hunting seasons.

REINDEER HUSBANDRY AREA	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013
derogations applied for			74	59	120	85
derogations granted	25	47	57	53	57	66
number of individuals bagged under derogations	11	10	26	10	23	11
REST OF FINLAND						
derogations applied for			21	10	17	52
derogations granted	26	6	6	4	4	7
number of individuals bagged under derogations	19	4	3	0	2	4

3.1.4 ECOLOGICAL POPULATION MANAGEMENT RISKS IDENTIFIED IN THE RISK ANALYSIS

Ecological risk factors in the population management of large carnivores were examined in all five risk workshops. Ecological population management risks in many areas are related to social population management risks, as well as to economic risks. Indeed, obstacles to achieving ecological objectives arise from social conflicts. Below is a list of threats addressed in the risk workshops.

The conservation status responded slowly to changing large carnivore populations, with updates being made at ten-year intervals.

- With regard to the lynx, the minimum population estimate has increased by nearly 1000 individuals from 2007 to 2013 – this increase is not reflected in the conservation status.
- With regard to the wolf, the minimum population estimate has declined to the extent that the wolf is currently a critically endangered species – this is not reflected in the conservation status.

The contentious relationship between hunters and large carnivore researchers over the years has resulted in a major lack of trust between them. This has led to census problems.

- Tassu, the large carnivore observation database, has not always worked properly due to technical difficulties, thus resulting in a lack of trust in the system.
- The lynx census has not been kept up-to-date – this is reflected in a lack of trust towards the accuracy of large carnivore censuses.
- This lack of trust has led to a situation where hunters feel that the FGFRI represents the interests of conservation stakeholders and its population estimates are not considered reliable. Consequently, the population management objective is considered as being based on incorrect population data.
- Wolf collaring has become more difficult due to this lack of trust.
- The lack of motivation by hunters to report any carnivore observations distorts and complicates population censuses. This is largely due to a lack of trust. Follow-up observations of large carnivores are not reported if there is a feeling that the observations will not have an impact on the population estimate. Also, the costs associated with checking on follow-up observations are considered unreasonable, particularly in situations where the observer feels that the observation has no real meaning or benefit to him or her.
- Regional censuses, which are considered useful, suffer from a lack of research and game administration resources.
- Also in the reindeer husbandry area, censuses are uncertain due to the low number of large carnivore observations reported. This is due not only to long distances, but also a lack of trust between reindeer herders and the game administration. The low density of the observer network and road network compared to the rest

of Finland partly explains the lower number of large carnivore observations.

The derogation system is seen as a step in the right direction. However, difficulties have been encountered in its use.

- Inflexibility in the granting of derogations on a damage basis, such as the difficult application process, difficulties in identifying the individual causing damages, and a short derogation period is an obstacle to the social acceptance of large carnivores.
- The dependence of derogations on a damage basis for wolves on the yearly quota set for them hinders wolf population management.
- Within the reindeer husbandry area, the hunting of bear and lynx is also complicated by the late hunting season, thus allowing them to retreat across the border before it begins.
- The concern with hunting large carnivores under a derogation on a damage basis is their branding as only vermin. This unfavourable development is also supported by the fact that individuals hunted under a derogation on a damage basis belong to the state.

Individual risk factors were also addressed.

- Illegal killing has resulted in a collapse of the wolf population.
- Polarisation of the wolverine population is a population genetics problem.
- Half of the wolverine population is found within the reindeer husbandry area, where it causes a great deal of economic damage and is, therefore, a target for illegal killing.
- A lack of female bears in the management area for a developing population slows down the even distribution of the bear population throughout the country.
- The adverse effects of carrion feeding, particularly with regard to bear diet, as well as the risk of bears becoming habituated to humans.
- Caring for injured large carnivores and releasing them back into nature results in habituated individuals.
- The Finnish Border Guard is obligated to report the observation of large carnivores only in the border zone, not large carnivore observations for the entire operating area.
- There are not enough resources for large carnivore research.

3.1.5 ACHIEVEMENT OF ECOLOGICAL OBJECTIVES IN POPULATION MANAGEMENT

This section presents evaluators' overview of: 1) achieving the ecological population management objectives of the current large carnivore policy; and 2) the actions required for the development of future population management in order to achieve the population management objectives specified in section 4.2.

SUCCESSES

- Wolf population estimates are further specified by means of local censuses, which are also used as reference data for determining the accuracy of population estimates. Thus far, the estimate data obtained using both census methods have been very well in line with each another. This means that estimates of the wolf population can be considered reliable. However, estimating the population is not considered reliable 'in the field', which results in a lack of social acceptance of the large carnivore policy. This is discussed in greater detail in section 3.3.3.
- Estimation of the bear population is trusted, even though there is some room for improvement.
- Based on derogations used and population growth, it can be said that the use of bag limit adjustments has achieved the population management plan objectives for keeping the wolf population at present levels within the reindeer husbandry area.
- Reindeer disperse into Scandinavia each year, although in small numbers. There is cooperation with Sweden on this matter.
- The lynx population in Finland has grown and dispersed into new areas.
- The bear population in Finland has gradually grown and dispersed into new areas.
- Transferring the authority to grant derogations for large carnivores from the Ministry of Agriculture and Forestry to regional game management districts in 2008 and then to the Finnish Wildlife Agency was a step in the right direction.
- The process for granting derogations has been accelerated considerably. For wolf, the new decree concerning three hunting seasons has eliminated situations in which a responsible authority might intervene. This is a successful change.

- Derogations on a damage basis for lynx and bear granted without a maximum limit throughout Finland at the discretion of the Finnish Wildlife Agency is a successful change.
- The updating of the Tassu database in November 2013 is step towards building trust.
- In the game administration, instances where social tolerance has been exceeded have been identified in areas with large carnivore populations. An effort has been made to address this situation with derogations on a population management basis, which are intended to cut population growth and disperse densities.
- Nordic cooperation is continuous and will be further developed.

AREAS NEEDING IMPROVEMENT

- Where large carnivores are concerned, there is a need to more closely examine the conservation status at the national level so as to base the argumentation through conservation status on a more up-to-date population.
- The functionality of the Tassu large carnivore observation database must be maintained and the local large carnivore contact person network must be trained and motivated on a continuous basis.
- The wolverine population has little genetic diversity, and there were signs of a recent bottleneck effect in both subpopulations. The DNA of the wolverine population in the reindeer husbandry area should be monitored using faecal samples. In addition to data on the number of individuals in the wolverine population, research would also provide additional information on the annual dispersal of wolverine and their litters in Finland, Sweden and Norway. More accurate population estimates would provide additional support for the regulation of and compensations due to the wolverine population.
- The translocation of wolverine should be continued. Consisting of some 70-90 individuals, the eastern wolverine population is stable despite its small size, which shows that it does well in areas where the medium-sized cervid population is small[44]. Translocation would strengthen the eastern population, whilst alleviating the economic and social pressures caused by wolverine in the Fell Lapland high density area for wolverine.
- Estimating the size of the wolverine population requires additional input in both the reindeer husbandry area and the rest of Finland. Reporting the observation of all large carnivore species in the reindeer husbandry area should be further developed. Reindeer herding cooperatives and reindeer herders should be given incentives to participate in the monitoring of carnivore populations.
- The lynx census should be brought up to date as soon as possible. Local censuses should be continued.
- DNA-based censuses of the bear population should be further developed to provide a more accurate population census.
- Hunters participating in population monitoring and research should be supported to ensure the provision of feedback.
- The manner in which the minimum population estimate is reported should be developed to meet the wishes of the field. The FGFRI should issue one 'main figure' each year, stating the minimum number of individuals for each species of large carnivore. Despite this, there should be free access to key number estimates.
- In order to achieve a more even distribution of the bear and lynx population, rapid responses for dealing with regional densities should be ensured.
- Considerably more derogations on a damage basis have been granted for lynx, bear and wolf than the number of individuals actually bagged. This indicates problems in the terms of derogation use, which should be further developed to meet the given need.
- The derogation system should be made place-based, so that derogations can be granted based on need, ensuring that the population situation for the entire country does not affect the derogation decision.
- Where bear and lynx are concerned, there is good cause to consider adopting the three-year bag model. This would also facilitate the effective utilisation of local censuses.
- It should be possible to grant derogations on a population management basis for wolverine and wolf in their high density areas or areas where there are constant social problems with wolverine or wolf. The granting of derogations on a population management basis promotes the game animal status of large carnivores.
- Thought should be given to establishing closer cooperation with the Border Guard in recording large carnivore damages throughout their jurisdiction, not only for large carnivores crossing the border.

[44] Koskela A. 2013: Wolverine habitat selection, diet and conservation. Väitöskirja, Genetics acta universitatis ouluensis; a scientia e rerum naturalium 614.

- Regulations concerning the use of carrion should be simplified and improved.
- Transborder population management should be strengthened with Sweden, Norway and Russia.
- In order to ensure the reliability of population censuses and large carnivore research, attention should be focused on the social acceptance of large carnivore policy objectives and actions. This will be discussed in section 3.3.5.

3.2 ECONOMIC SUSTAINABILITY OF LARGE CARNIVORE POPULATION MANAGEMENT

Where economic sustainability is concerned, the costs of game administration and research as well as allocations for compensating and preventing damages caused by large carnivores were taken into account.

3.2.1 ADMINISTRATIVE AND RESEARCH COSTS

In the game administration, estimating the resources to be used in the management and research of large carnivores is a challenge. In the Game and Reindeer Husbandry Unit of the Department of Fisheries and Game at the Ministry of Agriculture and Forestry, the number of expert-level person-years in large carnivore administration during the review period was 1.7-2.2. As large carnivores are at the core of the work of the Finnish Wildlife Agency, it is difficult to specify their percentage of the workload. Each year, several person-years and administrative tasks are devoted exclusively to advice and training related to large carnivores. In all, an average of 14.5 person-months are used each year for large carnivore advisory work at the Finnish Wildlife Agency.[45] Additional information on the content of the advice and training can be found in section 3.3.1. In 2008, when the authority for granting derogations was transferred to the game management districts, there was a need to recruit a person who would serve as a support person and adviser in reindeer husbandry matters for the northern game management districts. The task assigned was to improve large carnivore observation in the reindeer husbandry area, meet the information needs of the new compensation system for reindeer damages, and develop measures for the prevention of damages.

In 2011, during the review period for this evaluation, the game administration was restructured by combining the Hunters' Central Organisation and 15 regional game management districts to form the Finnish Wildlife Agency. The National Wildlife Council and the 15 Regional Wildlife Councils were founded to promote regional views and develop stakeholder work. The overall goal of this restructuring was to eliminate administrative redundancies, enhance operational efficiency and strengthen the customer-orientation. Public administration tasks, such as the granting of derogations, were separated from other operations and placed under the supervision of the Director for Public Administration Tasks, who is appointed by the government. This restructuring of the game administration was a positive step towards a more open and participatory game policy.

The Ministry of Agriculture and Forestry provided funding for large carnivore research during the period 2007-2012, as follows: a total of €973,620 in research funding from the state budget joint research appropriations, a total of €832,754 in research funding from development project funding for the promotion of hunting and game management, and a total of €2,060,792 in research funding for research on compensation for damages and damage prevention measures.

Although the FGFRI is the most important body conducting research on large carnivores (Table 8), Aalto University, the University of Helsinki Ruralia Institute and the Finnish Wildlife Agency and its regional offices have also conducted large carnivore research with funding provided by the Ministry of Agriculture and Forestry during the review period. The FGFRI Game Research and the Finnish Game Foundation have jointly published the *Suomen Riista* series since 1946. Suomen Riista is a peer-reviewed journal issued once a year. Each year, the FGFRI and the Finnish Wildlife Agency host a two-day national game conference, which is attended by hundreds of experts in the field.

The FGFRI is actively engaged in a wide range of international cooperation in large carnivore research. There is constant cooperation in the form of exchange of information, joint publications and visiting scholars with, for example, several Nordic and Russian partners. FGFRI's researchers are permanently involved in the LCIE, which reports to the European Union and makes, among other things, international population estimates for use by the Commission. The FGFRI also produces species-specific reports for EU Habitats Directive reporting.[46]

[45] Summary compiled by Harri Norberg on person-months used for large carnivore advice in 2007–2012.

[46] Statement Vesa Ruusila 20.6.2013

Table 8. Resources, person-years and funding used by the FGFRI in large carnivore research in 2007–2012.

FGFRI large carnivore research	2007	2008	2009	2010	2011	2012	Total
Person-years	9	13	11	10	11	12	67
Funding							
- FGFRI	703 960 €	750 295€	937 546 €	723 903 €	829 508 €	1 210 919 €	5 156 130€
- MAF	436 474 €	458 544 €	427 856 €	467 184 €	582 445 €	100 000 €	2 472 503 €
- total research funding	88 620 €	86 957 €	180 000 €	95 283 €	100 000 €	100 000 €	650 860€
- carnivore damage	312 100 €	346 434 €	150 670 €	302 278 €	422 445 €	0 €	1 533 927€
- hunting and game management promotion	35 754 €	25 153 €	97 186 €	69 623 €	60 000 €	0 €	287 716€
- Academy of Finland					26 178 €	197 222 €	223 400 €
Total	1 140 434 €	1 208 839 €	1 365 403 €	1 191 087 €	1 438 131 €	1 508 141 €	7 852 033 €

During the review period, Metsähallitus participated in three DNA-based bear population monitoring studies in 2007, 2009 and 2011. A total of one person-year was used for this research. Metsähallitus is also a key actor in large carnivore monitoring in Lapland,[47] and it is responsible for wildlife monitoring on state-owned lands (2005/1157). A total of 11 game and fisheries wardens together with hundreds of local wildlife wardens monitor the legality of fishing and hunting activity and off-road traffic, for example. Game and fisheries wardens monitor wildlife in cooperation with other authorities and stakeholders. Wildlife monitoring is focused on the observation of illegal killing of large carnivore and examining the acceptance of the large carnivore policy (section 3.3.3.).

The objectives for research stated in the population management plans for lynx, bear and wolf have been achieved in many respects. Research funding is allocated to meet the stated objectives. Where the lynx is concerned, the focus is placed on basic biological research, such as its diet and population dynamics. Basic research has also been conducted on bear, in addition to which an effort has been made to improve the estimation of the bear population using DNA methods. Broad-based wolf research was developed to include both ecological and sociological aspects, and the geographical range of wolf research has also been expanded into areas where the wolf population is growing. Research has been conducted on illegal killing of large carnivores and community support for it, for example. Funded by the Academy of Finland, the FITPA project (Human-Wildlife Transactions: A Pragmatist Approach to Institutional Fit), which seeks solutions for a more satisfactory coexistence between humans and wolves, is currently underway in Southwest Finland. During the review period, the projects involving wolverine concerned the preparation of the wolverine population management plan and a dissertation on wolverine habitat selection, diet and genetics, for which the FGFRI provided support by allowing the use of GPS tracking collars.

A total of €2,060,792 in research funding was used for carnivore damage compensation research and damage prevention measures during the period 2007-2012. On the subject of damage prevention:

- research was conducted on the prevention of damages caused by wolves and other large carnivores through the use of livestock guardian dogs
- a telephone information service was maintained to reduce the risk of losing hunting dogs in wolf territories where wolf dispersal is tracked with GPS tracking devices
- fencing materials were procured for the prevention of animal husbandry and apiary damages and promoted a national on-call and training service in this area
- FN303 less-lethal compressed air launchers were procured for use by SRVA personnel ("official assistance in large game matters").

And:

- the extent, variation and causes of carnivore damages, particularly those caused by wolverine as well as the functionality of the carnivore compensation system, were examined

[47] Statement Tuomo Ollila 3.7.2013

- the mortality of reindeer calves caused by large carnivores was examined using mortality transmitters
- GPS transmitters were procured for lynx, bear and wolf.

Finland has fewer research resources than other Nordic countries. In Norway and Sweden, extensive research projects have been established around each large carnivore. A high level of wolverine research has been conducted in Norway and Sweden since 1996[48]. The joint Norwegian-Swedish ScandLynx project, which has over ten lynx researchers and receives funding from the respective states and municipalities as well as from various organisations, deals with lynx[49]. The resources used in bear and wolf research are also considerable compared to those used in Finland. Since 1987, Sweden and Norway have jointly funded the Scandinavian Brown Bear Research Project[50], which has produced a wealth of data on bear, for use in both population management and the provision of general bear information. In terms of wolf research, a similar joint research effort was made with SKANDULV – The Scandinavian Wolf Project°, which was launched in 2000. SKANDULV funding was provided by the states as well as research funding sources and companies, organisations and foundations.

[48] Det Norske Jervprosektet <http://www.jerv.info/>; Det Svenska Järvprojektet <http://jarvprojektet.weebly.com/>

[49] ScandLynx, The Scandinavian Lynx Project, <http://scandlynx.nina.no/scandlynxeng/Home.aspx>

[50] Scandinavian Brown Bear Research Project, <http://www.bear-project.info/>

3.2.2 APPROPRIATIONS ALLOCATED FOR THE COMPENSATION AND PREVENTION OF DAMAGES CAUSED BY LARGE CARNIVORES

The statistics presented here have been compiled from the Information System of the Rural Business Administration, unless otherwise specified. Large carnivores cause a great deal of economic damage, which the party suffering the damage is compensated for by state funds. The grounds for damage compensation are described in section 2.2.3 above. Figure 11 lists large carnivore damages for the whole of Finland and the compensation paid for them during the period 2007-2012. Where reindeer are concerned, compensation for the loss of calves and exceptionally large damage to reindeer entered into effect in 2009. Reindeer damages are considerable and affect approximately 1,000 reindeer herders each year[51]. Even though other damages caused by large carnivores (excluding reindeer damages) are considerably smaller in terms of compensation amounts, they still affect hundreds of people each year.

[51] Statement Keijo Alanko 9.12.2013

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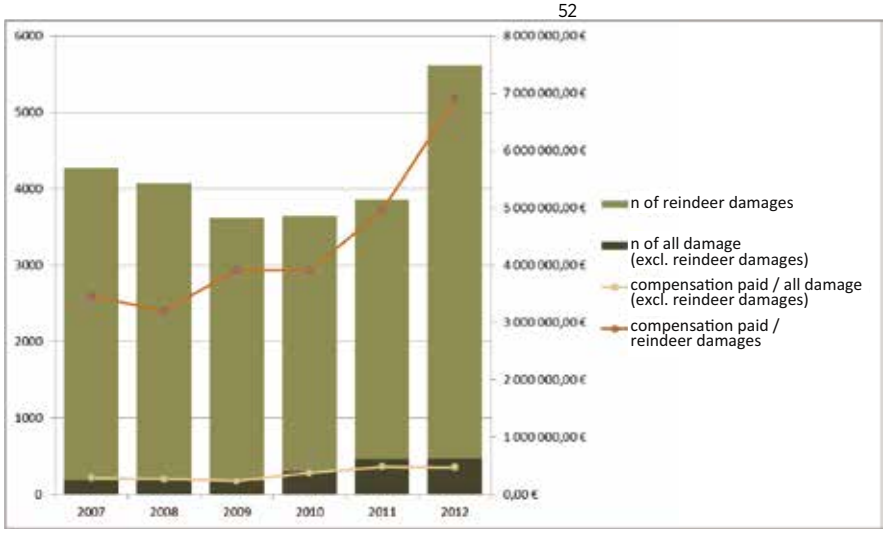


Figure 11. Large carnivore damages for the whole of Finland (axis 1y) and the amount of compensation paid for them (axis 2y) during the period 2007–2012[52]. Reindeer damages comprise information on reindeer found killed by large carnivores, whereas other large carnivore damages are cases involving damage. One case of damage may involve the loss of several animals in a single instance.

[52] Total amount of compensation paid for reindeer damages: information provided by Jussi Laanikari, MMM.

Each year, the Ministry of Agriculture and Forestry allocates €500,000 for the prevention of large carnivore damages. The aid in question may be applied for e.g. for purchasing fencing materials. The Finnish Wildlife Agency is responsible for the distribution of fencing materials against large carnivores. Previously this was the task of the game management districts.

DAMAGES TO REINDEER STOCK

The wolverine causes the greatest amount of damages to reindeer stock (Figure 12). These damages are concentrated in Fell Lapland and the eastern reindeer husbandry area, where, according to population estimates, approximately 50% of Finland's entire wolverine population occurs. The percentage of damages caused by other large carnivores varies from year to year. These damages are concentrated in the southern reaches of the reindeer husbandry area and corridors along the eastern border.

Bears cause the majority of the calf losses. According to a Swedish study, bears kill an average of 11 calves per bear between calving and 9 June, while females with one-year-old cubs claim as many as 18 calves per bear[53]. Reindeer damages caused by bear have declined during the period 2007-08 (Figure 12), which is also partly due to a reduced number of bears within the reindeer husbandry area. This decrease in the amount of damage caused by bear can also be partly explained by the Game Animal Damages Act, which entered into effect in 2009. Under the Act, no separate compensation will be paid for calves found killed between calving and the last day of November; rather, reindeer herding cooperatives will be paid compensation for the loss of calves as stipulated in the Game Animal Damages Act. This may have contributed to fewer reports of calves killed by bears being made to rural administration authorities compared to the period 2007-08.[54]

Lynx population growth in the reindeer husbandry area (see Figure 4) correlates with the damages caused by lynx. At peak levels, the reindeer damages caused by lynx amounted to over 950 reindeer (Figure 12) in 2009. This also corresponds to the growth in population since 2007. Damages declined in 2010 and 2011, falling to below 600 reindeer, and then rose again in 2012 to over 700 reindeer.

In the areas of the Kainuu and North Ostrobothnia Centres for Economic Development, Transport and the Environment (ELY Centres), wolf and lynx caused an exceptional amount of damage to reindeer stock, whereas wolverine damages were concentrated in the area of the Lapland ELY Centre (Figure 13). The wolverine population estimate in the reindeer husbandry area and compensation paid for reindeer killed by wolverine in the reindeer husbandry area during the period 2002-2012 are presented in Figure 14. According to modelling based on the food intake requirement of wolverine, they would need approximately 20 reindeer each year, assuming that a majority of the wolverine's food intake consists of reindeer and the carcasses of prey animals killed by other large carnivores were not available. Conversely, the wolverine, which can take advantage of reindeer killed by lynx or wolves moving in the same areas, kills far fewer reindeer each year. The figure shows that confirmed wolverine damages do not correlate with the number of wolverines. There are three alternatives to explain this lack of correlation. Statistical data on the compensation paid for reindeer killed by wolverine would require a wolverine population of as many as 120 individuals in the reindeer husbandry area. It is therefore possible that there are far more wolverine than can be determined by the observation methods used. The second alternative is that reindeer killed by some other means are considered to have been killed by wolverine. The third alternative is that some wolverines which are harassed are forced to hunt reindeer for food at a higher rate than would otherwise be necessary.

In Finland, the compensations paid for reindeer damages are equivalent to those paid in Sweden and Norway (Table 9), despite the differences in the compensation procedures. In Norway, sheep damages caused by large carnivores are also considerable, almost equal to reindeer damages.

Comparison of damages caused by wolf conducted by the Ministry of Agriculture and Forestry in 2011 (Table 10) shows the particular costliness of wolf in the reindeer husbandry area. The annual damages caused by wolf in the reindeer husbandry area are far beyond what they are in other areas of Finland, Western Europe or the United States. Every effort has been made to reduce the risk that this poses to economic sustainability by focusing hunting pressure on wolf in the reindeer husbandry area (section 3.1.3.).

[53] Karlsson ym. 2013: Björnpredation på ren och potentiella effekter av tre förebyggande åtgärder - Ett samarbetsprojekt mellan Viltskadecenter, Skandinaviska björnprojektet, Udtja skogssameby och Gällivare skogssameby. - Rapport från Viltskadecenter 2012: 6, 56 ss; kts. myös Järvenpää, J. & Norberg, H. 2013: Ruotsalaistutkimus karhun saalistuskäyttäytymisestä.-Poromies 80(4): 18-20.

[54] Statement Harri Norberg 5.12.2013

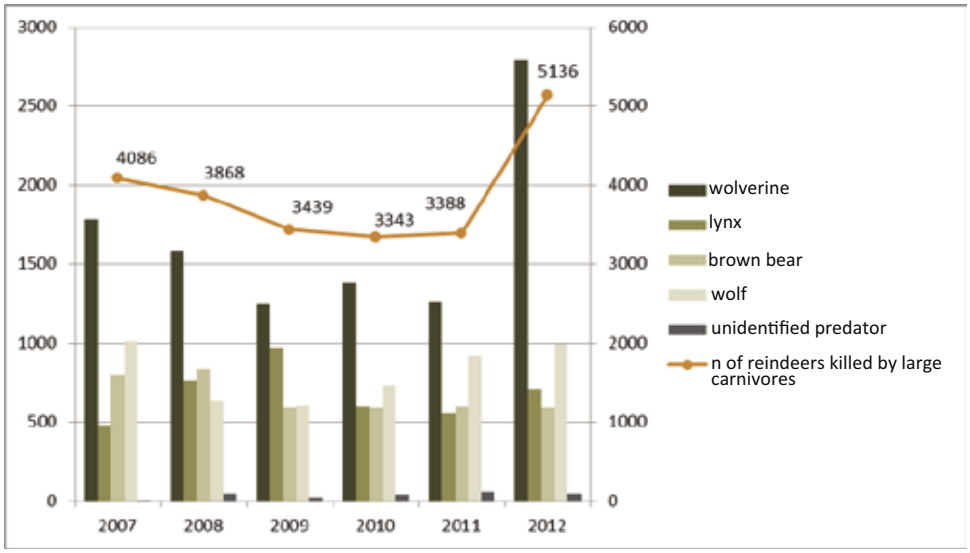


Figure 12. Reindeer found killed by each large carnivore species (axis 1y) and combined total of reindeer killed by all large carnivore species (axis 2y) during the period 2007–2012.

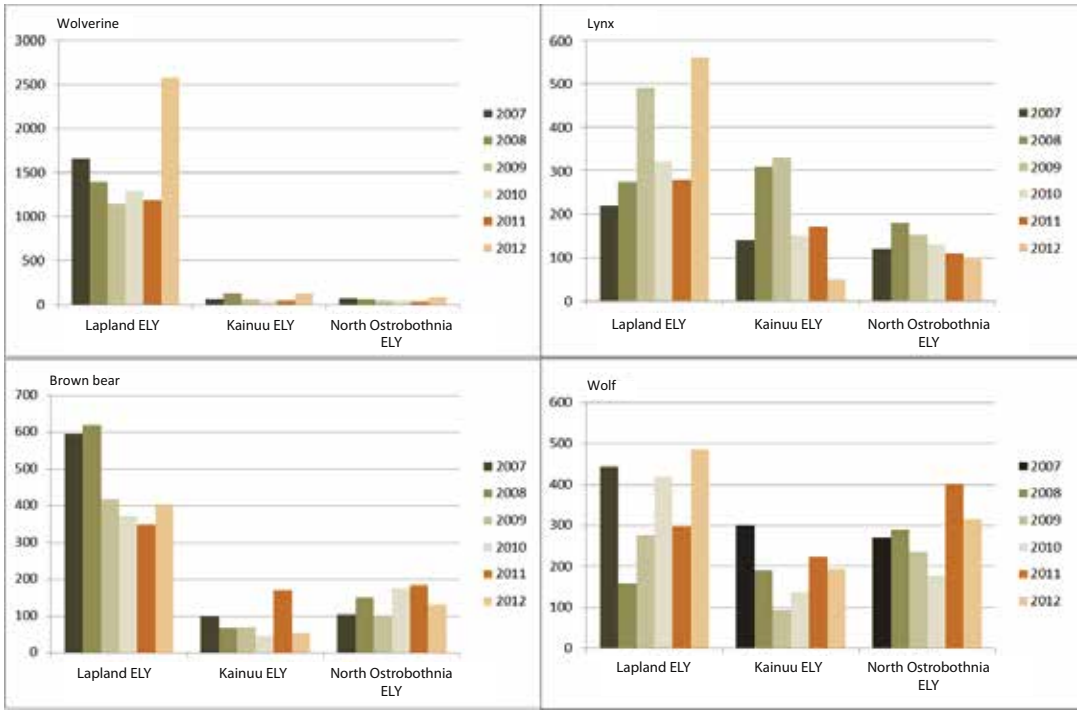


Figure 13. Reindeer found killed by large carnivores in the Lapland, Kainuu and North Ostrobothnia ELY Centre areas during the period 2007–2012.

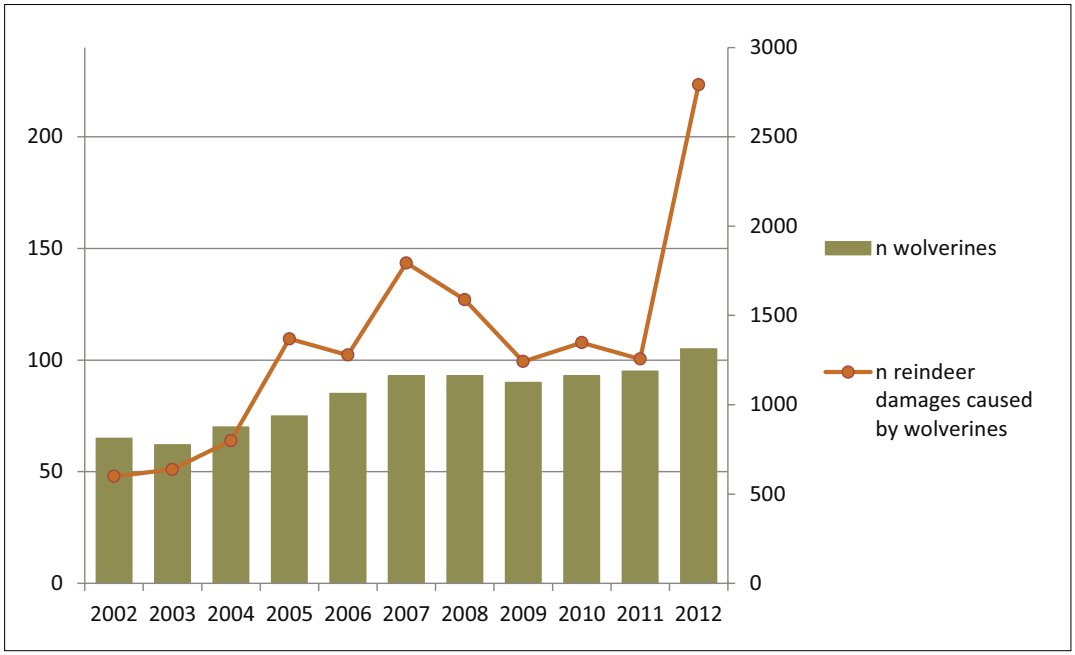


Figure 14. Minimum wolverine population estimate for the reindeer husbandry area and the number of reindeer killed by wolverines for which compensation was paid during the period 2002–2012.

Table 9. Paid compensations for damages caused to reindeer by large carnivores in Finland, Sweden and Norway rounded to the nearest thousand euros during 2010-2012.

	2007	2008	2009	2010	2011	2012
Finland[54]	3 456 000 €	3 202 000 €	3 916 000 €	3 913 000 €	4 960 000 €	6 900 000 €
Sweden[55]	4 770 000 €	6 715 000 €	6 255 000 €	6 172 000 €	6 822 000 €	6 964 000 €
Norway[56]	3 123 000€	5 428 000 €	5 703 000 €	6 595 000 €	6 486 000 €	6 666 000 €

Table 10. Comparison of the number of wolves and damages caused by wolves (€) between Finland, Western Europe and the United States.[55]

	Spain	Italy	Portugal	Francea	Minnesota, USA	Western USA	Finland – reindeer husbandry area	Rest of Finland
N of wolves	2 000	500	350	30	2 500	666	20	140
Damages caused by wolves (€)	1.9M	1.9M	700 000	190 000	61 380	37 000	1.3M	104 000
cost €/ wolf individual	950	3 800	2 000	6 333	25	56	**65 000**	**743**

[55] Maa- ja metsätalousministeriön asetus poikkeusluvalla sallittavasta Suden metsästyksestä poronhoitoalueen ulkopuolella metsästysvuonna 2012—2013, muistio.

OTHER DAMAGES

Figure 15 lists the damages caused by lynx, bear and wolf (excluding reindeer damages) over a three-year period, from 2010 to 2012. In addition to the damages listed in the figure, large carnivores have also caused approximately €4,500 in damages to non-living property during the period 2007–2012. The damage information for this period is taken from the Information System of the Rural Business Administration, listed by damage type, thus making comparison possible. Bear is the biggest cause of damages to sheep and the only cause of damages to apiaries and crops. Damages to bees occur most where there is also a strong bear population, i.e. in eastern and central parts of Finland (Table 11).

The wolf is the biggest cause of damages to dogs. Over a three-year period (2010-2012), there were a total of 129 cases of damage to dogs, of which 81% were caused by wolf, 16% by lynx and 3% by bear. Damages to dogs occur mostly in areas where the wolf population is strongest, i.e. North Karelia, North Ostrobothnia, North Savo and Kainuu (Table 11).

Lynx primarily cause damages to dog and sheep. During the period under review, damages caused by wolverine to livestock other than reindeer have been extremely minimal, only involving a few incidents of damages to sheep stock or property. There were more damages to sheep in Lapland, Central Finland, Satakunta and South Savo (Table 11). In Lapland, damages to sheep are primarily caused by bear, in Central Finland wolf, in Satakunta lynx and wolf, and in Central Finland lynx, bear and wolverine. Recorded damage cases may involve several animals. For example, in cases of damage to sheep in 2010-2012, one damage case comprised, on average, of seven sheep killed by a large carnivore.

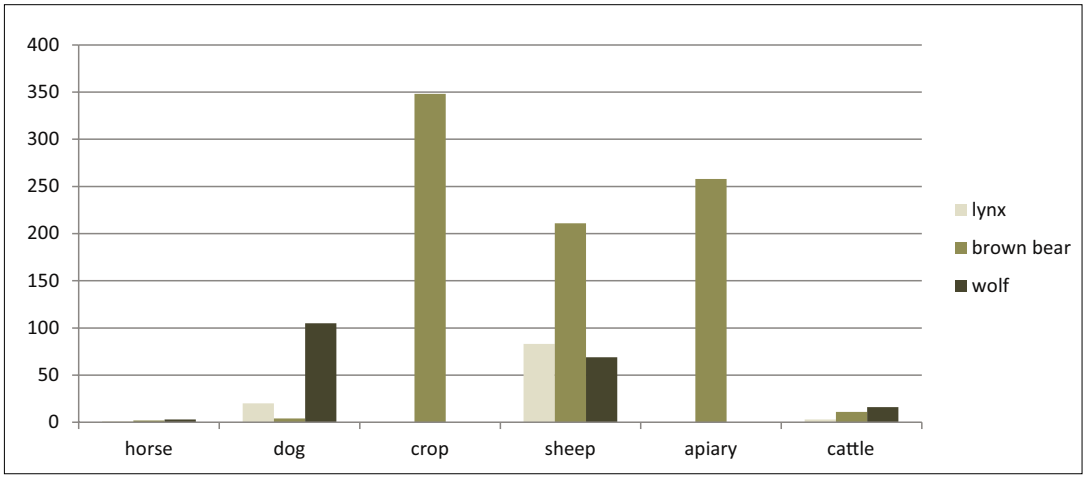


Figure 15. Cases of damage (excluding reindeer damages) caused by lynx, bear and wolf in 2010–2012. One case of damage may involve damages to several animals.

Table 11. Confirmed cases of apiary damages caused by bear; and damages to dog and sheep combined with compensation paid for them in 2010-2012, by ELY Centre. One recorded case of damage may involve the killing of several animals.

Damages by ELY Centre	Apiary damages	Compensation paid €	Dog damages (n)	Compensation paid €	Sheep damages (n)	Compensation paid €
Uusimaa	1	2236	3	2 606	4	3 465
Southwest Finland	0	0	3	2 582	3	31 912
Satakunta	3	6892	6	11 865	29	23 398
Häme	26	27 161	4	10 131	5	4 684
Pirkanmaa	10	6 413	3	8 750	5	851
Southeast Finland	84	134 129	6	16 743	2	3 789
South Savo	37	40 245	5	7200	25	8 746
North Savo	38	52 373	24	67 448	9	4 524
North Karelia	36	55 217	33	87 736	15	9 234
Central Finland	42	59 499	2	4 800	35	15 609
South Ostrobothnia	2	5 755	5	17 146	1	431
Ostrobothnia	9	24 370	0	0	13	3 017
North Ostrobothnia	9	7 028	11	29 606	0	0
Kainuu	1	900	20	47 091	8	8 441
Lapland	0	0	4	7 384	174	205 585
Total	**298**	**422 217 €**	**129**	**321 088 €**	**328**	**323 685 €**

3.2.3 ECONOMIC POPULATION MANAGEMENT RISKS IDENTIFIED IN THE RISK ANALYSIS

Economic risk factors in the population management of large carnivores were examined in all five risk workshops. Economic population management risks in many areas are related to social and ecological population management risks. Below is a list of threats to the economic sustainability of population management addressed at the risk workshops:

Large carnivores cause a great deal of economic damage each year.

- Reindeer damages are quantitatively large and hamper the practising of reindeer husbandry. They also cause indirect problems, such as financial management and social problems.
- Indirect damages caused by large carnivores are not compensated for. Reindeer compensation is only paid for reindeer found killed by large carnivores, with searches remaining the responsibility of reindeer herders. With the exception of compensation for the loss of calves, no compensation is paid for indirect business losses. In addition to reindeer husbandry, other businesses are also affected by the lack of compensation for the future value of breeding animals.
- Compensation is only paid for animal individuals killed by large carnivores. However, a lynx preying on a fur farm or a wolf hunting in a sheep paddock can result in a significant decline in production for years to come, due to a decline in the reproduction of livestock badly frightened by the predators.
- The payment of compensation for large carnivore damages is slow. Compensation is taken through the supplementary budget, which slows the payment process. This causes financial problems for business operators.
- Carnivore damages in the reindeer husbandry area affect the payment of compensations elsewhere in Finland.
- Carnivore damages in other areas of Finland affect hundreds of people each year, even though the compensation amounts have remained at a moderate level in relation to all compensations paid.
- Damages caused by large carnivores are closely linked to their social acceptance. In particular, damages to hunting dogs caused by wolves are considered serious.

- Verification of reindeer damages is challenging. Rural authorities do not investigate reported damages frequently enough.

The prevention of damages caused by large carnivores.

- There is no other way to prevent damages to reindeer stock other than by removing the individuals causing the damage and derogations on a population management basis.
- Preventive measures are not accepted or very well received by the field. This is especially evident in areas into which large carnivores are slowly dispersing.

In addition to this:

- Large carnivores cause regional reduction in game numbers. Hunters feel that the failure to give consideration to game losses in discussions on large carnivore population management or their dismissal as a matter of minor concern is problematic.
- The financial resources of the game administration are not considered to be adequate, which is manifested in the slow payment of compensation and the lack of prevention alternatives.
- Reform of the game administration in 2011 resulted in allocating more resources for a few years to implementing the reform measures.
- The lack of resources for monitoring hunting activity makes illegal killing easier than when under strict surveillance, but can also, for example, lead to blame being shifted to reindeer herders.

3.2.4 ACHIEVEMENT OF ECONOMIC OBJECTIVES IN POPULATION MANAGEMENT

This section presents evaluators' overview of: 1) achieving the ecological population management objectives of the current large carnivore policy; and 2) the actions required for the development of future population management in order to achieve the population management objectives specified in section 4.2.

SUCCESSES

- A special effort has been made to prevent damages by fencing in apiaries, which is in accordance with the objective set in the bear population management plan.
- Achieved through bag limit adjustments, the reduction in the reindeer husbandry area bear population has also reduced the amount of damages caused to reindeer by bear.
- FN303 less-lethal compressed air launchers have been ordered and taken into use by SRVA personnel ("official assistance in large game matters"). Personnel all over the country have been trained in proper use of the launchers.
- The use of livestock guardian dogs has been investigated, in accordance with the objective set in the wolf population management plan.
- The scope of wolf research was developed to include both ecological and sociological aspects.
- Reform of the game administration in 2011 was the right step towards a more open and participatory game policy.

AREAS NEEDING IMPROVEMENT

- Regional and large carnivore-specific damage data should be made available to anyone and it should be accurate.
- Damages to reindeer stock caused by wolverine have got out of control. Thought must be given to a territorial compensation practice for wolverine in Fell Lapland.
- The number of wolverines in Fell Lapland must be determined using commonly accepted practices, whilst the amount of damage caused by wolverine must be brought down to a tolerable level by means of translocation measures and derogations.
- The lack of trust in reindeer damage levels must be eliminated. In order to do this, uniform and effective practices for reindeer damage field surveys should be developed in all reindeer husbandry area municipalities. The use of mobile devices for verifying damages should be developed.
- Carnivore damages in the reindeer husbandry area affect the payment of compensation for large carnivore damages in other areas of Finland. The compensation systems for the reindeer husbandry area and the rest of Finland should be separated.
- New funding possibilities for preventive measures, such as building fences, and a direct compensation method should be investigated. Large carnivores affect all of society and the possibility of using different sources of funding should be investigated.
- Regional stakeholders should be involved in preventive measures, such as building anti-predator fences or development projects.
- The occurrence of large carnivore damages varies by region, depending on the large carni-

vore populations and economic structure of the region. These regional differences should be identified and innovative preventive measures for each region should be supported.
- Wildlife monitoring, police, game administration and Finnish Border Guard cooperation should be enhanced.
- The expertise of rural authorities responsible for the inspection of damages caused by large carnivores should be increased.

3.3 SOCIAL SUSTAINABILITY OF LARGE CARNIVORE POPULATION MANAGEMENT

In examining the social sustainability of large carnivore population management, attention was given to the openness, involvement and social acceptance of the large carnivore policy.

3.3.1 TRANSPARENCY OF THE LARGE CARNIVORE POLICY

The transparency of the large carnivore policy was evaluated by examining the information, advice and training related to large carnivores. Although this analysis focused on the comprehensiveness of the content, geographical coverage was also taken into consideration. Information and advice were examined together, whilst training related to large carnivores was examined on its own.

INFORMATION AND ADVICE

MATERIALS AND METHODS

Achieving the social acceptance of the large carnivore policy requires successful communication. In this analysis, communication is defined as large carnivore-related information and advice, which were also addressed in large carnivore population management plan sections concerning the measures to be taken. Particularly when giving thought to the development proposals for the large carnivore policy, information on the comprehensiveness of communication and the treatment of each species were seen as necessary.

The Ministry of Agriculture and Forestry, Finnish Game and Fisheries Research Institute and Finnish Wildlife Agency jointly handle wildlife communication, which also comprises topics on large carnivores. The objective of communication on game is to provide up-to-date information on, for example, the large carnivore policy and hunting as well as offer people a channel for inquiring about these topics. Various game communication channels include the Cervid newsletter, MAF, FGFRI and Finnish Wildlife Agency websites, press releases and press conferences, as well as the MAF and Finnish Wildlife Agency Facebook pages and Twitter accounts[56]. In addition to the above-mentioned parties, Metsähallitus also participates in large carnivore-related information and advice.

In examining information and advice, large carnivore information provided by the Finnish Wildlife Consortium, including various publications, websites and social media channels, was used as reference material. The Cervid newsletter, Metsästäjä magazine, Riistan vuoksi magazine, Apaja customer magazine and Kieppi journal from the period 2007-2012 were used in examining publications. All news presented in the Cervid newsletter was examined, not only articles on large carnivores. Every article or story on large carnivores presented in the Metsästäjä, Apaja, Kieppi and Riistan vuoksi publications were examined.

All articles on large carnivores were analysed consistently by using an approach typical to news reporting, i.e. looking for an answer to the questions what, where, when, how, why and who. This revealed the species discussed in the articles and the essential content. The content was analysed by means of qualitative classification. Articles were classified by species, with articles individually focusing on each species of large carnivore examined separately. Because the number of species-specific texts was relatively small, their content was examined as a whole for each species. Articles discussing all large carnivores together were examined in their own category. These texts were classified based on content, thus providing an overview of the topics addressed in the texts. In publications where few articles appeared as a whole (Riistan vuoksi, Kieppi, Apaja), texts were examined as a single whole. In content analysis, attention was also given to the temporal dimension and geographical emphasis of the articles. In examining digital and social media, the focus was to describe the websites and social media channels of various Finnish Game Consortium actors and examine their accessibility. In examining websites, particular attention was given to their content. With regard to social media channels, the focus was on their adoption date, number of 'likes' and update frequency.

[56] Statement Iina Bister, 7/2013

With regard to stakeholder and citizen wishes for large carnivore information and advice

In socioeconomic studies preceding and based on large carnivore population management plans (The wolf discourse in Finland, Between lynxes and people, Bear management and public attitudes in Finland, and Wolverine management and public attitudes in Finland), national and regional stakeholders and citizens were asked to present their views on large carnivores and the management of their populations. Where all large carnivores were concerned, information was highlighted as one area where there was a need for improvement. What was significant here was that, for each large carnivore species, people felt that information played a key role, even serving as the best way to promote and facilitate the coexistence of large carnivores and humans. Information was seen as being crucial to dispelling prejudices and changing attitudes.

The wishes of citizens regarding the nature of information were quite clear regarding all large carnivores: the overarching desire was simply that more research should be conducted on large carnivores in Finland and the research data produced should be made available more quickly and extensively to all. Interest and the need for information were focused on basic issues, such as the dispersal, habits, behaviour, population size and growth of large carnivores. Particularly where the wolverine was concerned, it was felt that there was a major lack of information, even at a basic biology level .When discussing the lynx, there was also a desire to diversify the image of large carnivores by not only publishing purely statistical and research data, but also sharing stories with the general public. With regard to wolves, there was a particular interest in information on wolf dispersal provided by tracking collars. For people living in areas with large carnivore habitats, receiving information was considered extremely important.

People wanted the information disseminated on large carnivores to be, above all, accurate, reliable, transparent, up-to-date and pertinent. Honesty, impartiality and consistency were therefore demanded, whether being told of the harm that carnivores cause or their harmlessness. Fanatical and exaggerated information was considered undesirable. Indeed, where the wolf was concerned, there was a desire for reasoned, carefully chosen information. From a regional standpoint, there was a desire for information to be provided primarily at a regional level.

These citizen and stakeholder views served as the basis for drafting the national large carnivore population management plans. Consequently, attention was also given to these same points in this evaluation.

National large carnivore population management plan objectives for information and advice

In the population management plans for lynx, bear and wolf, the distribution of information is considered a key tool in their implementation. The basis of these plans is that, as large carnivore populations grow, so too does the importance of accurate information and its requirements. The objective is to ensure that the results of large carnivore research and monitoring 'are made available to the public in a timely and geographically comprehensive manner.' The goal is to reach all citizens. The importance of popularisation, i.e. increasing public consciousness, is emphasised.

One particular problem in the wolf population management plan is the wide range of information available – it is difficult for average citizens to differentiate accurate and neutral information from that with a bias and ulterior motive. The importance of neutral, active and accurate information is therefore emphasised.

In the plans, special attention is given to the parties responsible for information. The role that the Finnish Game and Fisheries Research Institute and Metsähallitus Petola Visitor Centre as well as the attendant www.suurpedot.fi website play in providing information is emphasised. The statutory hunters' organisation is also seen as a key provider of information and advice, as the organisation mandate is to provide training, advice and information and for its operational network and information to reach the entire hunter community, not to mention a large percentage of other population segments. There is also a desire for the organisation to increase the level of tolerance towards large carnivores through functional information and advice to hunters.

The parties responsible for providing information on large carnivores should ideally also be proactive, define citizen needs for large carnivore information, and improve citizen knowledge of large carnivores by means of training, advice and information.

WEBSITES

In examining information and advice on websites, the focus was placed on the Ministry of Agriculture and Forestry, Finnish Wildlife Agency, Finnish Game and Fisheries Research Institute and Metsähallitus websites.

Ministry of Agriculture and Forestry

The Ministry of Agriculture and Forestry website (www.mmm.fi) contains a wealth of information on game management and game administration. For example, there is comprehensive information on the structure of the game administration as well as the acts and decrees in game legislation. The fundamentals of hunting and game management are comprehensively presented, with instructions on hunting licences and game management fees, for example. The population management plans, their preparations and objectives are presented on the website, where all completed plans are available for reading. Basic information on international game policy cooperation and the use of game as a source of food are also presented. There is also a section devoted to game damages and the related compensation. Statistical data on the damages caused by large carnivores during the period 2000-2010 is comprehensively presented on the Ministry's website. However, more recent data must be requested separately or sought from news releases. The website also contains a large number of links to the Finnish Wildlife Agency, Finnish Food Safety Authority Evira and FGFRI websites as well as game-related legislation on Finlex. A link to the Cervid newsletter can also be found on the main page in the Fishing, game and reindeer section. The Ministry of Agriculture and Forestry website is available in Finnish, Swedish and English.

Finnish Wildlife Agency

The official website of the Finnish Wildlife Agency (www.riista.fi) offers visitors news, guidance and information on game-related matters. The website also presents information on the game administration, its operating principles and bodies, such as regional game authorities. There is also information on public administration tasks carried out by the Agency. The website offers a wide range of materials for use in education and training as well as for anyone interested in game-related matters. Hunters are provided with information and instructions on hunting times and methods as well as services such as hunters' insurance. One of the website sections is devoted to members of the media. All of the periodicals mentioned above can be read on the riista.fi website.

The Finnish Wildlife Agency website is in four languages: Finnish, Swedish, Sámi and English. Last updated in April 2013, the website now offers more basic information on game management, among other things. Access for mobile devices and connections to social media channels were also improved. Based on a user survey, there are plans to add game and hunting-themed video material.

In 2012, the riista.fi website had a total of approximately 400,000 individual visitors, who visited the site approximately 800,000 times. The number of visitors is high, especially in the autumn: for example, in September 2012 there were approximately 100,000 visitors to the site. Hunting times and licences are the most popular topics.

The Finnish Wildlife Agency website has a link to the RiistaWeb Game information website. RiistaWeb is a database consisting of contact, event and game information for the Finnish Wildlife Agency and game management associations. Information is maintained by the Finnish Wildlife Agency, game management associations and the Finnish Game and Fisheries Research Institute. Events organised by the Finnish Wildlife Agency and game management associations are listed under event information, contact information of supervisory and sales personnel at the Finnish Wildlife Agency and game management association, among others, can be found under contact information, and population, hunting licence and hunting bag information also for small game, can be found under game information. All information can be searched for by administrative unit. The language options are Finnish, Swedish and English.

RiistaWeb does not, however, actually provide information on large carnivore populations. It should be noted that the Finnish Wildlife Agency does not provide any information on large carnivore hunting bags recorded in its hunting licence system on the statistics section of its website. Only the lynx is mentioned on RiistaWeb and the information is inaccurate. Only the FGFRI database provides proper statistics on large carnivores. Information on other large carnivore mortality is not readily available.

Finnish Game and Fisheries Research Institute

The Finnish Game and Fisheries Research Institute website (www.rktl.fi) has its own, clearly-defined section for game-related matters. The Game section is divided into game-related information on large carnivores, cervids, seals, small game, endangered species as well as guidelines and forms. A wealth of information can be found under these

sub-headings, particularly concerning the dispersal of various species populations as well as the research and specification of population size. The information can be found only after browsing through several pages. Where large carnivores are concerned, there are questions and answers on large carnivore population estimates, collaring and the FGFRI's role in the large carnivore policy. The section on endangered species contains information on conservation status and its definition. The section containing guidelines and forms offers information on conducting game censuses and recording results as well as a presentation of the Tassu large carnivore observation database. The section containing information on research and statistics also offers information concerning game animals. There is a link to the Cervid newsletter and suurpedot.fi website on the main page.

In 2008-2012, the number of visitors to the large carnivore section of the FGFRI website was examined. Statistical data on, among others, the number of page views, number of individual views and the average amount of time spent on each page was made available. Most noteworthy was the 2012 rise in the number of pages viewed compared to previous years. During the period 2008-2011, the number of individual views on large carnivore pages was approximately 38,000-50,000, whereas in 2012 they totalled over 94,000. During the same period, the total number of page views was approximately 63,000-80,000 a year, whereas in 2012 they were approximately 143,000, i.e. roughly twice the number of previous years. During the period 2008-2011, the pages containing information on large carnivore population abundance received the highest number of visits – approximately 7,500-8,500 individual visits each year. Other popular pages were those presenting information on wolf, bear and lynx. In 2012, the page presenting information on wolf was by far the most popular page, with over 27,000 individual visits made to the page. Other popular pages included those dealing with the monitoring of large carnivore population abundance and large carnivore observations. In 2012, therefore, there was a significant increase in the number of visitors interested in topics related to large carnivores on the FGFRI website, with the greatest amount of attention being focused on wolf and large carnivore population abundance.

The FGFRI website contains information on the wolf telephone information service, which is maintained by the FGFRI and funded by the Ministry of Agriculture and Forestry. The purpose of the telephone information service is to reduce the risk of wolf attacks on hunting dogs. The service was offered in 2004-2005 and 2011-2012. Running from the beginning of September to the end of December, the service allowed hunters to check whether a collared wolf was recently moving through the hunting area. The service applied to wolf territories where there was at least one wolf individual fitted with a GPS tracking collar. The service was popular: for example, in 2011 the service received over 4,000 calls.

In 2013, an online service available to all was launched. The service made it possible to see where collared wolves had been at the time of their last positioning.[57] The online service does not provide the precise position of an animal, but Finland is divided into 5 x 5 kilometre sectors. The positioning observations for each wolf are updated in the service in five hour intervals, provided that the animal is in open terrain at the time of the positioning – only then is positioning possible. The animal must also be within the GSM coverage area for the collar to be able to transit the positioning data. This new online service was launched in an effort to meet the wishes of users who have used the wolf telephone information service. The service will run through the turn of the year to the end of the hunting season. It is open around the clock and positioning data is updated more quickly than on the wolf telephone information service.

Metsähallitus

On the Metsähallitus website, there is relatively little information on game-related matters. The information presented deals primarily with Metsähallitus' hunting licences and wildlife monitoring. Instead, those interested in hunting and looking for Metsähallitus hunting licences are clearly guided to the website eraluvat.fi, where it is possible to purchase Metsähallitus hunting licences from the online shop. The website presents basic information on the licences sought, such as pricing, general licence terms and the types of different licences, as well as the criteria used in setting quotas for the future sale of licences. In addition, the website presents information on the nature conservation work, such as bird wetlands, which is carried out using proceeds from the sale of Metsähallitus hunting licences. The website also lists information on various hunting areas on Metsähallitus lands as well as the history and performance of wildlife monitoring. Although the updating of the Metsähallitus-administered website suurpedot.fi was patchy during the review period, this was later rectified.

[57] Service can be found at: http://pantaseuranta.rktl.fi/

PUBLICATIONS

Five different publications were used as reference material, one of which is only available in electronic form and the other four both in print and electronic form. The Cervid newsletter is a game affairs periodical published by the Finnish Wildlife Consortium four to six times a year. Issues are sent directly to the subscribers' email addresses. The Finnish Wildlife Agency also provides information on game-related matters in two different periodicals, which can also be read online. Distributed to all hunters six times a year, Metsästäjä magazine is the Finnish Wildlife Agency's most important advice and training tool. In circulation since 2012, Riistan vuoksi is the Finnish Wildlife Agency's newsletter on participatory game policy. It is published once or twice a year. Apaja is the customer newsletter of the Finnish Game and Fisheries Research Institute. Released once a year, Kieppi is Metsähallitus' customer newsletter for hunters. Articles appearing in these five publications on large carnivores are the focus of this analysis.

Cervid newsletter

Cervid is a free game affairs newsletter jointly produced by the members of the Finnish Wildlife Consortium, i.e. the Ministry of Agriculture and Forestry, Metsähallitus, Finnish Wildlife Agency and Finnish Game and Fisheries Research Institute. The newsletter is issued electronically approximately four times a year and can be ordered on the Ministry of Agriculture and Forestry website by anyone interested in game-related matters. The issues are sent directly to the subscriber's email address. The topics addressed in the newsletter are current matters related to game policy, research in the field and practical game management. The purpose of the newsletter is to increase knowledge of game populations, their management and research, among other things. The newsletter has been published since May 2007 in both Finnish and Swedish. The circulation of Finnish and Swedish newsletters and information on the number of opened newsletters were examined for the period 2009-2012. During this time, the number of Finnish newsletters sent out ranged between 3,529 and 4,767, reaching the highest point in 2011. During the period 2009-2012, the number of Swedish newsletters sent out reached its lowest point (171) in 2009 and highest point (260) in 2012. All in all, well under half of all newsletter subscribers read the newsletter each year. Prior to 2009, there was no readership data available.

Cervid newsletter - wolverine

Unlike the other large carnivores, there was not a single article exclusively on the wolverine in the Cervid newsletter. Wolverine were only mentioned in articles dealing with many or all of the large carnivores. This is puzzling, considering that all other large carnivores were systematically given individual attention, if relatively rarely. Where the wolverine is concerned, information on the basic traits of the species and its population management situation, for example, are now completely lacking.

Cervid newsletter - lynx

Only five articles dealing with the lynx were published in the Cervid newsletter during the period 2007-2012. The news topics were extremely similar, as four of the five articles were press releases dealing with Ministry of Agriculture and Forestry regulations and objectives for lynx population management throughout Finland. The press releases explained the reasons for raising the maximum permitted hunting bag above FGFRI recommendations during the period 2008-2010. In 2011, it was assessed that the lynx population management had been successful. In 2008, it was suggested that lynx were not well represented in the discussion on large carnivores, particularly when wolves were brought up, even though its population has shown a sharp increase, being distributed throughout Finland more evenly than other carnivores. After this observation was made, however, there was no increase in stories on lynx in the newsletter.

Cervid newsletter - bear

News and articles on bear in Cervid newsletters were fact-oriented by nature throughout the review period. Key article content included annual bear hunting quotas issued by the Ministry and hunting bags by region, as well as the grounds for issuing the quotas. In 2008, readers were informed of the tools and methods used in the bear population census as well as the challenging nature of the process, among other things. Stories on changes affecting the trade in bear meat and its parts were also presented. The appearance of articles on bear varied from year to year: in 2008, several texts devoted exclusively to bear were published, whereas in 2009 and 2012 there were no articles devoted to bears in the Cervid newsletter at all. All in all, there were only seven news stories involving bear in the newsletter out of a total of 145 articles. Regionally, the news was focused on either all of Finland or Northern and Eastern Finland.

Cervid newsletter - wolf

Of all the large carnivores, wolf clearly receive the largest share of attention in the Cervid newsletters. Particularly in 2007 and 2012, the wolf was written about a great deal. A total of 13 articles on wolf were published during the review period. Articles devoted exclusively to wolf were rather diverse in nature. News stories both presented information on wolf research and provided an overview of the more common national and international wolf policies. Stories referring to Finland's commitment to EU policy, which significantly curtails the authority of the national wolf policy, were highlighted on a couple of occasions in 2007 and 2012. Wolf collaring was a central theme in 2011-2012 articles, which discussed FGFRI collaring projects and the importance of collaring to wolf research. Wolf was also the only species for which the newsletter presented more detailed basic ecological information, by means of simple questions and answers, for example. The news was quite comprehensive regionally, but with an emphasis on Northern and Eastern Finland. However, changes in the wolf population throughout Finland received surprisingly little attention in the articles. It was not until 2012 that the small size of the wolf population and its dispersal into Western Finland was addressed.

Cervid newsletter – large carnivores

As a whole, large carnivores received a great deal of attention in the Cervid newsletters during 2007-2012. News on all large carnivores was published nearly every year except for 2011, with eight stories at the highest point and two at the lowest. Regionally, all articles discussing large carnivores covered all of Finland, the Nordic countries and, in some news, all of Europe. The reindeer husbandry area, Kainuu and Eastern Finland were singled out as individual areas. In terms of content, articles on large carnivores can be roughly divided into five topic areas: 1) those dealing with large carnivore research and information; 2) those providing information on legal amendments, political or administrative changes and proposals; 3) those related to large carnivore damages; 4) those dealing with illegal acts committed against large carnivores; and 5) those presenting large carnivore policy and administrative actors. With regard to large carnivore research and information, the articles presented information on the suurpedot.fi website and Petola Visitor Centre. At the same time, the collaring of large carnivores, collection of large carnivore observations and population census reforms were discussed. Articles dealing with political and administrative changes and proposals discussed, for example, how the Ministry of Agriculture and Forestry raised the indicative value of game animals as well as transferring the authority to grant derogations to game management districts. Articles on large carnivore damages presented information on livestock guardian dogs and trends in the amount of damage caused by carnivores. Articles discussing illegal acts committed against large carnivores dealt particularly with their illegal killing. Articles on large carnivore administration and policy actors presented information on Advisory Committees on Large Carnivores, local large carnivore contact persons and SRVA "official assistance in large game matters") activities, for example. In terms of content, the articles were quite diverse, concerning a wide range of actors, such as authorities, researchers, hunters, nature conservation actors, dog owners and, ultimately, all Finns.

Cervid newsletter - summary

According to the Cervid newsletter presentation, its sole purpose is to increase information on game populations, population management and research. The goal of the newsletter is to cover the latest important stories on game policy and research in the field as well as the actual practice of game management. The goals themselves promise wide-ranging and up-to-date information on game animals. For the entire review period, the number of articles on large carnivores was very high compared to articles on other game species. However, this trend declined during the period 2007-2011 (Figure 16). In the quantitative and qualitative analysis of species, the greatest amount of attention was given to the wolf (Figure 16). Where the wolverine is concerned, it can be said that there was a failure in the provision of information. Individual information on the wolverine population or its research was not provided to the readers of the newsletter. Instead, the wolverine was merely compared with other carnivores, if at all. Also where the lynx was concerned, information remained rather one-sided, as nearly all the articles on lynx dealt with population management regulations handed down from the Ministry. News on bear was slightly more diverse. It can be said that the content of articles discussing all large carnivores is diverse, as the topics included research, large carnivore policy and game administration alike. Likewise, the subject matter was often topical and inspired discussion.

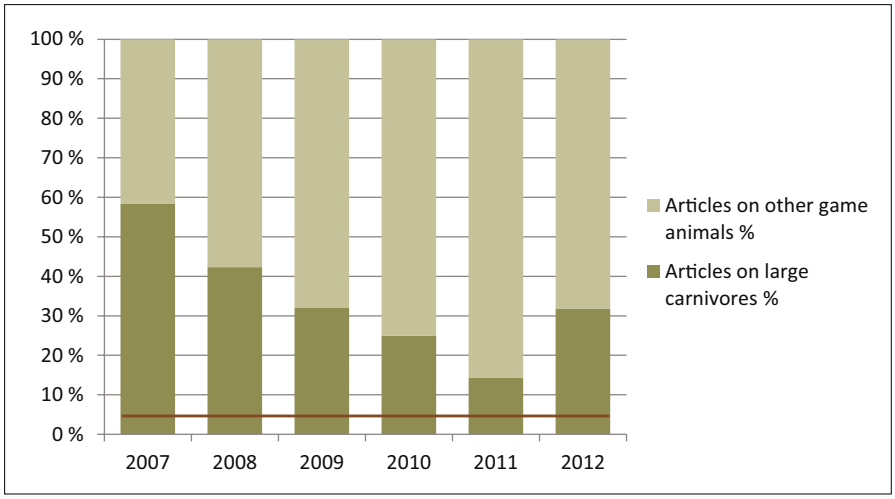


Figure 16. Ratio of articles on large carnivores to all articles in the Cervid newsletter in 2007-2012. The red line indicates the large carnivore percentage of all game animals.

Riistan vuoksi newsletter

Riistan vuoksi is the Finnish Wildlife Agency's electronic newsletter, which is published once or twice a year. The publication focuses on the preparation of a participatory game policy and presents the principles and background to management plans, discusses the progress of planning processes and summarises the policies and measures of the management plans being drafted. The newsletter can be viewed on the Finnish Wildlife Agency website. The newsletter has a circulation of approximately 3,000, approximately 1,000 of which are sent to the national and regional partners of wildlife councils as well as organisation actors participating in stakeholder work, with the remainder being distributed at various events, for example. First launched in March 2012, the newsletter is published in the spring and autumn prior to Regional Council meetings. The Swedish version, *För viltet,* is published online in PDF format. The amount of information on large carnivores included in two issues of Riistan vuoksi from 2012, which served as the subject of this analysis, was quite meagre. The lynx received by far the most attention of all the species, as both issues discussed the separate census of the lynx population, which was carried out in January 2012. The tracks of other large carnivores were also included in this census. The other text concerning large carnivores was an article dealing with Finland's wolf policy. The article presented the basic principles on the framework and limitations of the wolf policy in Finland as well as the role that the Ministry of Agriculture and Forestry and Finnish Wildlife Agency play as a policy implementer. There were no articles dealing with all large carnivores collectively in any publications in 2012, with, for example, game birds receiving far more attention in the issues. The lack of information on large carnivores in Riistan vuoksi in 2012 was quite natural, as the primary aim of the newsletter is to address population management plans and their preparation process. In 2012, there was no preparation of large carnivore population management plans underway, so attention was naturally directed at other species.

Kieppi newsletter

Once every year, Metsähallitus' Natural Heritage Services publishes the free Kieppi newsletter, which is distributed by mail to customers from the past couple years and newsletter subscribers. The newsletter is released in January and presents topical information on hunting, game management, hunting licences and monitoring. The newsletter has a circulation of 45,000.

During the period 2009-2012, large carnivores were given little attention in Kieppi, with the exception of the 2009 issue, when half (3) of the total number of articles (6) were devoted to them. Likewise, half of the articles were exclusively devoted to bears and bear hunting. The other articles dealt with wolves (1) or all large carnivores (2).

The core content of Kieppi articles was information on the hunting opportunities provided by Metsähallitus and related experiences as well as Finnish hunting and hunting culture. As a result, the greater amount of attention given to bears and bear hunting in Kieppi can be explained by the fact

that the bear is the only large carnivore for which it is possible to apply for a hunting licence for hunting on state-owned lands.

Metsästäjä magazine

The Finnish Wildlife Agency's most important advisory and information tool is the Metsästäjä magazine. Issued six times a year, the magazine is sent to every hunter who has paid a game management fee (approximately 300,000 people). The magazine is issued in Finnish or Swedish, and it is an information package for all game affairs, presenting topical information on game management and the hunting of game stock, the relationship between game management and other uses of nature, and the status and importance of game animals in nature. The topics addressed include practical information on hunting and game management, hunting legislation, use of hunting dogs, wilderness life and the equipment it requires, and information on the operations, meetings and training of the Finnish Wildlife Agency. In addition to hunters, the magazine is distributed to numerous agencies, libraries, forestry and agriculture education institutions as well as associations and private individuals in Finland and abroad. The magazine is also published as an online version.

Metsästäjä magazine - wolverine

During the period 2007-2012, the number of articles devoted exclusively to wolverine in Metsästäjä was much smaller than that about other large carnivores. Only two articles concerned wolverine, with both appearing in 2008. One of these articles stated that the wolverine, with its small population, was overshadowed by the other large carnivores in research. It was also stated that the status and future evaluation of the wolverine population would require a wide range of research data for support. The other article discussed the one special objective of wilderness monitoring in 2008, i.e. securing the wolverine population.

Metsästäjä magazine - lynx

The number of articles in Metsästäjä magazine devoted exclusively to lynx was equal to that for bear. The number of articles varied each year between one and seven, with the lowest number of texts appearing in 2007 and the highest in 2012. A considerable number of the texts appearing in 2008-2012 dealt with the size of the lynx population, its growth and the methods and practices used in its evaluation and census. For example, in 2010, readers were presented with a history of lynx population growth as well as local censuses made for lynx in the winter of 2011 and 2012 and their results. With regard to research, a 2007 article discussed the fitting of lynx with satellite transmitters, which was followed up by a 2009 article presenting the findings on lynx habitats provided by the satellite transmitters. Game management perspectives were highlighted in 2012, with articles presenting research data on the impact that the lynx population has on fox and deer, for example. In a discussion on the whitetail deer, the last editorial published in 2012 criticised the current lynx population management plan for not recognising game management as a basis for population management. The body of articles was diverse, ranging from a 2008 story on a lynx hunt in Uskela in 1910, a 2010 story on the use of lynx meat in cooking, and another article in 2010 written by a lynx researcher, presenting their own findings. Articles on lynx were more clearly focused on the whole of Finland than bear and wolf. Other countries, especially Sweden and Norway, were used as examples and sources when presenting information on lynx research. Chronologically, the articles extended all the way back to the 19th century.

Metsästäjä magazine - bear

The number of articles and reports on bear published in Metsästäjä magazine each year ranged from two to six, with a total of 22 articles being published. Bear hunting, SRVA ("official assistance in large game matters") activities and the coexistence of bears and humans were key topics in news stories on bear. In 2009, articles presented the history of bear hunting and evolution of the various types of hunting, whilst in other years hunting was highlighted in bear hunting course listings and presentations of new shooting ranges, for example. Various statutes concerning the handling of bear killed were also given attention. SRVA activities were presented, for example, in a case history in 2012. The history and nature of the coexistence of bears and humans was addressed in 2007 in a comprehensive two-part article. Later, in 2009 and 2012, the focus of attention was placed on conflicts caused by bears. Examples of managing these types of conflicts were sought, in particular, from North America. Bear research and the data obtained through research were presented in 2008, for example, concerning bear habitats and their size. Regionally, the articles covered all of Finland, but with an emphasis on Eastern Finland.

Metsästäjä magazine - wolf

A total of 18 articles on wolf were published in Metsästäjä magazine, spread out evenly through-

out the review period. This number was slightly less than that for lynx and bear. Each year, two to four articles were published. In terms of content and nature, the articles were rather diverse, dealing with such topics as research and the data obtained from it as well as the intricacies of wolf policy. The articles were presented in a straightforward, factual manner as well as in columns. The size and growth of the wolf population as well as its monitoring received either direct or indirect mentions each year, such as through large carnivore censuses or hunting licence quotas. Research data was presented on the type and number of wolf prey species as well as wolf and dog genetics, among other things. In 2008-2009, special attention was given to the impact that wolf have on the population growth of prey animals—deer and moose—on which a discussion on values was also held. With regard to wolf policy, attention was given in 2007 and 2011 to national and EU-level conflicts in Finland and Sweden, and in 2010 an effort was made to emphasise the social aspects of wolf policy. Growth in the wolf population and the problems this causes were given attention in 2010 and 2012 in the Chairman's column, for example. Regionally, article content mostly concerned Finland, particularly Eastern and Northern Finland, but in many cases other countries, such as Russia and Sweden, were used as a basis for comparison. The temporal dimension reached back to ancient history through the genetic research of wolves, but most of the texts dealt with wolf-related topics in the 2000s.

Metsästäjä magazine – large carnivores

During the period 2007-2012, all large carnivores were addressed together in Metsästäjä magazine on a very regular basis, appearing in five to seven articles each year. The exception to this was in 2009, when there were a total of 17 articles on large carnivores, i.e. more than twice the number of the other years. During the period 2007-2012, 45 articles on large carnivores were published. Articles on large carnivores were divided into five different categories: 1) those related to large carnivore policy and conflict management as well as legislative amendments; 2) those focusing on population size and large carnivore research; 3) those related to illegal acts committed on large carnivores; 4) those dealing with volunteer activities; and 5) those presenting various large carnivore seminars and discussions. Articles on large carnivore conflicts, the management of conflicts with carnivores and legislative amendments addressed the following topics: the organisational restructuring of the game administration and operational challenges; national-level policies, such as in the form of government programmes and legislative amendments; and, in some articles, a general assessment and discussion of the large carnivore policy. Articles on population size and large carnivore research contained information on large carnivore censuses and their results, the principles used in carnivore population censuses, and carnivore researchers and their work. Illegal acts committed against large carnivores were addressed in articles presenting wildlife monitoring and considering the reasons behind illegal killing. These topics were addressed in the editorial, among other places. With regard to volunteer activities, the work performed by the SRVA ("official assistance in large game matters") organisation and local large carnivore contact persons was presented. Invitations to various large carnivore seminars and discussions were published, followed by a summary of the event. These articles could be categorised as listings, periodical texts, columns and editorials. Articles on large carnivores primarily discussed topical large carnivore matters in Finland, but some comparisons were made, particularly with other Nordic countries. Within Finland, the focus of the texts was more on the eastern and northern parts of Finland.

Metsästäjä magazine - summary

Metsästäjä provided a wide variety of information and writing. Article content was not limited to a presentation of facts and figures – there was also a certain amount of thought-provoking and editorial writing included. Editorials were, however, clearly identified as such (e.g. guest writer), so they could be easily distinguished from actual news stories. The wide range of articles was enhanced by a more historical angle taken in some articles, thus providing perspective to an issue. The range of topics was also wide-raging, particularly in articles on lynx. Texts on large carnivore seminars and discussions can be seen as one way of involving those interested in a given topic in the discussion. With regard to the number of articles, attention was given to the peak in 2009, when there was more than twice the number of articles published than in other years. It was during 2009 that the then Hunters' Central Organisation was actively engaged in projects for the establishment of, for example, SRVA("official assistance in large game matters") operations and the Tassu observation database. At the same time, attention was drawn to illegal killing, which was highlighted in news stories for the first time during the review period. The species receiving the most attention were lynx and bear, which were addressed together slightly more than wolf (Figure 17). Wolverine was somewhat overshadowed by the

other species, appearing in only 2% of the articles on large carnivores. Despite this, the need for wolverine research was indeed stated.

Apaja customer magazine

Published in print twice a year, Apaja is the customer magazine of the Finnish Game and Fisheries Research Institute. The FGFRI has also published an online version of the magazine – Verkkoapaja – since 2007. Verkkoapaja presents information on research results, research projects launched, research open houses and events, and other topical issues. The frequency of publication also increased during the review period. In 2007, three issues of the magazine were released – in 2012, the number of issues was 11. Verkkoapaja's content was not analysed in this evaluation.

The amount of attention devoted to large carnivores in Apaja mostly occurred at the end of the review period. In the 2007 issues there were no articles on large carnivores at all, whereas in 2010-2011 there were eight published each year. In other years, large carnivores were addressed in three to five articles. Carnivore research and research results were the core content of articles on large carnivores. Readers were informed of such topics as population monitoring methods and challenges. Some of the texts were very brief, concise news reports. The amount of attention given to each species differed greatly. Apaja gave the least amount of attention to wolverine (one article) and bear (two articles), whilst the most attention was given to wolf (13 articles) followed by all large carnivores (eight articles). Lynx were addressed in five articles. Towards the end of the review period, attention was increasingly focused on wolf, and in 2012 all five articles published on large carnivores were about wolf. The primary content of articles on wolf dealt with research, with ecology and coexistence between humans and wolves also receiving some attention. Apaja articles on large carnivores naturally focused on carnivore research, its methods and challenges as well as the data obtained from research. A noteworthy item was an increase in the number of articles on carnivores published during the review period. A clear trend could also be seen in the amount of attention devoted to each species, particularly at the end of the review period in 2012, when the wolf was the sole focus of attention.

SOCIAL MEDIA

In recent years, members of the Finnish Wildlife Consortium have become actively engaged in social media, particularly Facebook. Some of the social media channels, however, were adopted outside the review period, i.e. in 2013. The Ministry of Agriculture and Forestry joined Facebook in November 2009. The Ministry's Facebook page was found to serve as a meeting place for public officials and citizens. The objective is to increase transparency and interaction in preparing matters, with Ministry officials available through the service during business hours. The Ministry's page has been liked 679[58] times, with status updates being made every few days. Interaction on the page seems to be two-way, as numerous questions for the Ministry were also presented. The Finnish Wildlife Agency uses various social media channels, where communications are centrally managed by the Finnish Wildlife Agency communications team, with the Web communications planner assuming most of the responsibility for this. In the Finnish Wildlife Agency, personnel are encouraged to engage in personal networking and the use of social media. The oldest and most important social media channel is the Facebook page, which was set up in 2011 and has some 4,000 likers[59]. The Finnish Wildlife Agency also reaches over 500,000 friends of likers through its own likers. The Finnish Wildlife Agency's Facebook page can be viewed by anyone, regardless of whether they are a Facebook user or not. The page is updated several times each week. Interaction on Facebook goes both ways, as users are also able to post comments and other materials. The Finnish Wildlife Agency became active in social media at the end of 2013, with the adoption of other channels in addition to Facebook. Because the focus of attention is information provided during the period 2007-2012, the above-mentioned social media services adopted in 2013 were not included in the analysis. However, the Finnish Wildlife Agency's more active involvement in social media showed a positive trend.

The Finnish Wildlife Agency was active on Twitter, tweeting numerous times each day on game-related news and events. The Finnish Wildlife Agency has 180 followers on Twitter. Other channels used by the Finnish Wildlife Agency include YouTube, where the Agency shares all the videos it produces, SlideShare, where slideshows presenting interesting expert information or guidelines are shared, and LinkedIn, where, for example, available positions at the Agency are listed. YouTube and SlideShare also support the riista.fi website functions. Each page of the Finnish Wildlife Agency website has Facebook and Twitter buttons, which can be

[58] Situation as of 9.12.2013

[59] Situation as of 9.12.2013

used to share pages containing interesting, useful information with others. At present, the majority of the communications in social media is conducted in Finnish.

The Finnish Game and Fisheries Research Institute did not join Facebook until March 2013. It currently has over 754 likers[60]. Metsähallitus joined Facebook in 2009 and currently has over 8,928 likers[61]. The page is maintained by Metäshallitus Communications and is updated several times a day.

ADVISORY WORK

Large carnivore-related news reporting in the various Finnish Wildlife Consortium publications also included advisory work. Advisory-type news reporting included articles on game management and its reforms, large carnivore policy principles, legislative amendments, hunting regulations, and hunting course listings. Advice related to research included articles on the Tassu observation database and requests for the submission of hunting bag samples and reporting of carnivore observations. The most advisory-type content appeared in Cervid and Metsästäjä, in which the total number of articles was greater than that of the other publications.

Advisory activities related to large carnivores by the Finnish Wildlife Agency during the review period included the determination and distribution of carnivore damage needs, the steering of anti-predator fence planning and erection, anti-predator fence training courses, telephone advice, statements and advice on school transport issues and large carnivore-related advisory duties, such as interviews and on-site visits. In all, an average of 14.5 person-months are used each year for large carnivore advisory work at the Finnish Wildlife Agency.[62]

Petola

The Petola Visitor Centre was founded in 2005 around the theme of large carnivores. Located in Kuhmo, Petola is administered by Metsähallitus Natural Heritage Services. Petola's goal is to serve as a reliable and objective source of information and promote discussion on large carnivores. Petola has an exhibition and nature path as well as a wide range of information and education facilities. The Centre organises guided tours and a variety of events.

The number of visitors to Petola reached its peak in 2005, with approximately 18,500 visitors, and then declined gradually to approximately 13,000 visitors in 2012. The number of visitors during the period 2007–2012 was approximately 17,000 at its highest point and approximately 13,000 at its lowest. According to a customer survey conducted in 2006, Petola was very well received, but no customer surveys have been conducted since then. The main customer segments are schoolchildren and tourist groups. Associations and groups interested in large carnivore issues also visited Petola.

No major updates have been made to Petola's exhibitions since its founding. However, the Information section was updated in 2012, also including the addition of new content. Two to three temporary exhibitions have been hosted each year, most of which are related to large carnivores. In many cases, the temporary exhibitions are artistic in nature (photography, felting art, etc.). Temporary exhibitions account for less than 10% of all exhibitions at Petola. Petola is involved in developing and maintaining content for the suurpedot.fi website. During the period 2007-2012, permanent employees accounted for approximately 1.3 person-years at Petola and fixed-term employees 1.5-2 person-years.

TRAINING

In socioeconomic research, training did not receive the same degree of attention, valuation or demands as communications. The key need for training was, however, highlighted when discussing local large carnivore contact persons. Whilst their feedback system and motivation should be developed, they should also be given more training.

The national population management plan emphasises the statutory role that the Finnish Wildlife Agency (formerly Hunters' Central Organisation) plays as a provider of information, advice and training. Whereas information is aimed at everyone, advice and training is primarily intended for hunters. The training provided by the Finnish Wildlife Agency includes species identification, track identification and training in hunting and animal conservation legislation. Together with the Finnish Game and Fisheries Research Institute, it maintains a network with local large carnivore contact persons and provides training for them. The management plans endeavour to enhance training and

[60] Situation as of 9.12.2013

[61] Situation as of 9.12.2013

[62] Summary compiled by Harri Norberg on person-months used for large carnivore advice in 2007–2012.

advice provided by the Finnish Wildlife Agency in order to prevent damages and increase the social tolerance of large carnivores. With regard to lynx, there is also mention concerning the importance of training and advice in the management of the lynx population by hunters and its regional impact on the game management and hunting of other game.

Finnish Wildlife Agency training projects

During the review period, the Finnish Wildlife Centre conducted several training projects, which were funded by the Ministry of Agriculture and Forestry.

In 2007-2008, snow track censuses and their coordination were developed and trialled in Kainuu in 2008 for eventual application throughout the rest of Finland. At the same time, the number of wolverines, lynxes and wolves in Kainuu was determined and compared with the estimated number of large carnivores based on observations made. The proper identification of large carnivore tracks by hunters was also investigated. This work was continued in 2009 by developing large carnivore tracking methods in areas with dense lynx populations and little snow cover. In the winter of 2011-2012, this work was continued in five Wildlife Agency areas: South Savo, Central Finland, North Savo, Satakunta and Uusimaa. Stakeholders were also involved in the monitoring of large carnivore populations.

In 2008-2009, a joint cooperative organisation, consisting of the police, game administration and volunteer hunters, was formed to deal with conflicts caused by large carnivores in densely populated areas and injured large carnivores. Guidelines and training materials intended for use in the training of authorities and hunters in the above-mentioned organisation were also produced. This is called "Suurriistavirka-apua SRVA", i.e. official assistance in large game matters.

In 2008, a training package for large carnivore conflict management was put together for supervisory personnel in the game administration. However, the actual training was not carried out within the game administration according to the prescribed plans.

In 2009, local large carnivore contact persons were trained in the use of the Tassu observation database. Two training sessions were held in each game management district. In 2009, a guide for identifying large carnivores and large carnivore damages was also produced. Use of the guide was particularly aimed at local large carnivore contact persons, Rural Business Administration officials and game management association representatives involved in large carnivore damage on-site surveys. An illustrated guide was published in connection with the project[63]. In 2011, training involving Tassu and game administration in the reindeer husbandry area was provided. In cooperation with the Agency for Rural Affairs and Lapland ELY Centre, the Finnish Wildlife Agency also provided carnivore damage inspection training for rural authorities and game management associations in the reindeer husbandry area.

Finnish Game and Fisheries Research Institute training projects

Large carnivore-themed training provided by the FGFRI concentrated on extensive training sessions held for implementation of the Tassu large carnivore observation database. The training sessions were aimed at game management districts and associations, police and other authorities, reindeer herding cooperatives, cattle breeders, conservation NGOs, dog breeders and trainers, and, particularly, local carnivore contact persons. In 2009, when the system was launched, 33 training sessions were held all over Finland, with approximately ten sessions held each year after 2009. Other FGFRI training sessions included feedback discussions held in connection with separate lynx censuses. Approximately 20-30 discussions were held during each year regional censuses were made. In addition, approximately 20 information and discussion sessions on large carnivores were held for hunters each year.[64]

The FGFRI also participates in large carnivore-themed training by working in cooperation with various universities and education institutions. Instruction related to large carnivores is provided by the FGFRI at universities in some 15 events each academic year. This instruction involves on average a few lecture hours. Each year, guidance is provided for between two and six Master's theses and one or two doctoral dissertations. There are also one or two trainees from higher education institutions participating in large carnivore research each year. Although there is less instruction provided at the universities of applied sciences, a few lecture hours were offered. Guidance was provided for one or two theses at universities of applied sciences, with the same number of trainees being placed.

[63] Norberg, H., Kojola, I. & Härkönen, S. 2010: Petovahinkojen tunnistamisopas. (also available online)

[64] Statement Vesa Ruusila 20.6.2013

Other instructional activities involving large carnivores are general texts written by large carnivore researchers working in the social sciences for inclusion in compilations and blogs. *Petovahinkojen tunnistamisopas,* a *guide* to evaluating damages caused by large carnivores, which was jointly produced by the FGFRI and Hunters' Central Organisation, was published in 2010.

Metsähallitus training projects

Metsähallitus did not organise any large carnivore-themed training projects during the review period. Game wardens participated in Tassu training sessions.[65]

INFORMATION, ADVICE AND TRAINING - SUMMARY

In quantitative terms, the Metsästäjä magazine provided the most information on large carnivores (Figure 17). Cervid and Apaja also provided information on large carnivores on a regular basis, with Kieppi and Riistan vuoksi being less important sources of information. Roughly 41% of the articles on large carnivores appearing in various publications dealt with all large carnivores together.

With regard to wolverine, information provided by the Finnish Game Consortium can be seen as having fallen short, as there was very little information on wolverine available. Wolverine were highlighted occasionally in articles dealing with all large carnivores, with less than 2% of all articles dealing with large carnivores exclusively devoted to wolverine. The information provided in these few articles primarily dealt with research needs involving wolverine. As a result, the knowledge gaps on wolverine found even in socioeconomic research could not be filled through these information channels during the review period.

It can be said that the information provided on bear, lynx and wolf was far better than that on wolverine. Information was provided regularly on a wide range of topics and in ample quantity. Wolf received by far the most attention, with 23% of the articles on large carnivores devoted exclusively to wolf. The number of articles on bear and lynx was exactly the same (17%). Articles on wolf, bear and lynx can also be commended for their diversity and, particularly where articles on wolf are concerned, their range of topics.

In examining geographical areas in articles, it was noted that the regions with the highest densities of large carnivores –Northern and Eastern Finland – received by far the most mentions of all regions. Kainuu and municipalities within the

[65] Statement Pirjo Ilvesviita 1.7.2013

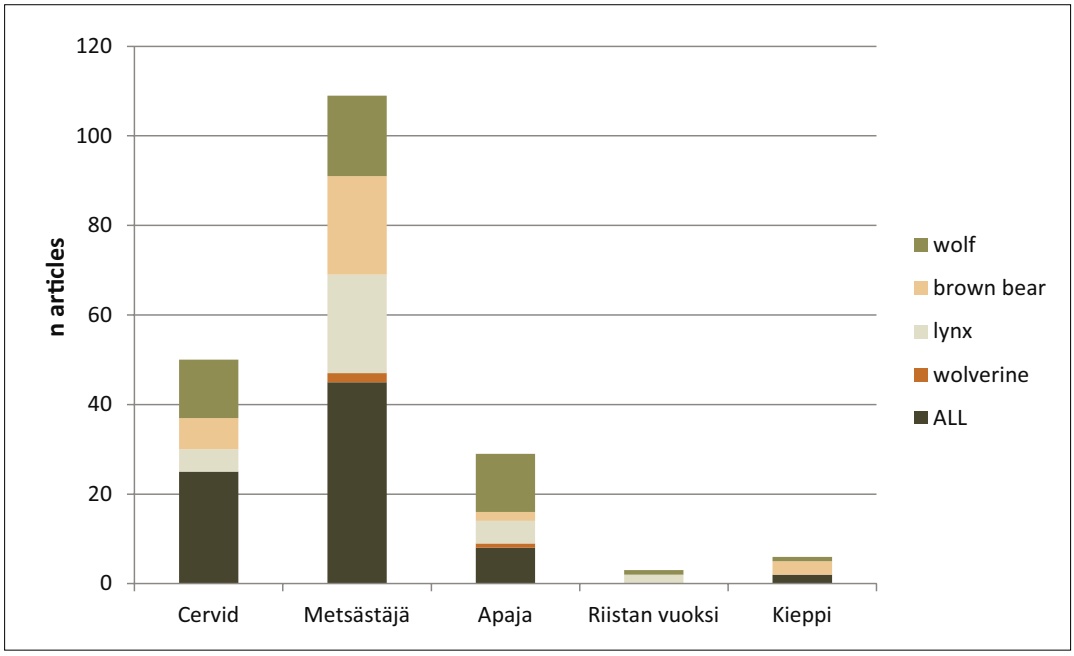


Figure 17. Number of articles on different large carnivores in Cervid, Metsästäjä and Apaja in 2007-2012.

Kainuu region were mentioned the most in articles. Other frequently-mentioned regions were North Karelia, the reindeer husbandry area, North Savo, Uusimaa and Central Finland.

During the period 2007-2012, the Cervid newsletter and Metsästäjä magazine served as a key information channel for the FGFRI, which regularly provided information on its research projects and changes in large carnivore populations to those interested in game-related matters. Information on large carnivore populations, population growth and population estimate methods, such as collaring and large carnivore censuses, comprised the core content provided by the FGFRI in its Cervid newsletter and Metsästäjä magazine. Readers were also given general information on large carnivore research and researchers, and key research data, such as that obtained from satellite tracking, was also presented. The Metsästäjä magazine also emphasised the interaction between the FGFRI and hunters. Hunters were asked, for example, to submit samples of their hunting bags to the FGFRI for examination and record any litter observations.

Statistical data on large carnivore populations, damages caused by large carnivores and the hunting and other mortality of large carnivores must be collected to meet both population management needs and the information needs of private persons. Also, more than statistical data on the living habits and various aspects of coexistence should be provided to meet large carnivore information needs. The Finnish Game Consortium information management strategy was completed in 2011[66]. Large carnivore population data, habitat data and hunting bag data was compiled in a single register for this purpose. In 2012, the Finnish Wildlife Agency began organising the compilation of scattered customer data into a single customer data system (e.g. hunter register, shooting test results, farm register, licence files, volunteer counters for game research) and implementing interactive electronic transaction services (e.g. applications, decisions, licences, agreements). These measures are, however, still in progress.

Statistical data on large carnivore populations and their fluctuations is produced by the Finnish Game and Fisheries Research Institute. This data is also shared by the Ministry of Agriculture and Forestry, the Finnish Wildlife Agency and Statistics Finland. Game damage statistics are produced by the Ministry of Agriculture and Forestry. Annual hunting bag statistics for large carnivores are collected in the Finnish Wildlife Agency licence system. Other than statistical data, responsibility for large carnivore information is separately maintained by Metsähallitus, which publishes the www.suurpedot.fi website. This online statistical data on large carnivores is scattered and, unfortunately, difficult to access, particularly where hunting bag and damage data is concerned.

The objectives for advice and training specified in population management plans were largely achieved, with large carnivore observation and population monitoring playing a key role in training. The initiation of SRVA ("official assistance in large game matters") activities and Tassu training, which were central during the review period, were highlighted through several different information channels.

3.3.2 LARGE CARNIVORE POLICY INVOLVEMENT

The comprehensiveness of stakeholder involvement and how large carnivore conflicts cited by stakeholders and the development proposals required for large carnivore conflicts were met during the implementation of population management plans were analysed in evaluating the degree of involvement of the large carnivore policy.

Stakeholder opinions on conflict situations involving large carnivores and development proposals were included in the analysis. Socioeconomic studies used in support of large carnivore population management: *The wolf discourse in Finland* (2005), *Between lynxes and people* (2006), *Bear management and public attitudes in Finland* (2006), and *Wolverine management and public attitudes in Finland* (2008), statements issued by regional stakeholders, and group stakeholder consultations held in the autumn of 2012 were used as materials.

Regional stakeholders were consulted in preparing the population management plans for wolverine, lynx, bear and wolf. This consultation, which was conducted as a written survey, was carried out in 2004 for all large carnivores at the same time. At that time, key parties directly involved with nature, its use and the supervision of its use were chosen as the regional stakeholder respondents. The stakeholder survey consisted mainly of essay questions, which allowed stakeholder representatives to present their own opinions on large carnivore species, population management and any development proposals.

[66] Maa- ja metsätalousministeriö, Tietohallintostrategia – Julkinen Riistakonserni 2012-2016, 16.6.2011 <http://www.mmm.fi/attachments/riistatalous/riistahallinto/63v2JJR2X/Julkisen_riistakonsernin_tietohallintostrategia.pdf>

Information on participants from South Häme, Central Finland, North Savo and Uusimaa was not available for use in group stakeholder consultations on large carnivores of Regional Wildlife Councils in the autumn of 2012. This type of regional stakeholder consultation on large carnivores was not carried out in North Karelia, but the matter was addressed at a meeting of the North Karelia Advisory Committee on Large Carnivores. According to our data, an average of 22 stakeholder participants (ranging between 11 and 32) participated in large carnivore consultations within the jurisdiction of the Finnish Wildlife Agency.

In socioeconomic studies done in support of large carnivore population management, the materials were addressed by stakeholders, whilst the groups formed in stakeholder consultations on large carnivores of Regional Wildlife Councils in the autumn of 2012 varied from region to region, but in such a way that the groups were comprised of representatives from different stakeholders. Materials collected from 2004 and 2012 cannot therefore be compared with one another, nor were we able to examine stakeholder views of the materials or any changes in them. Instead, the materials collected were categorised according to the population management areas specified in the population management plans. The analysis focused on the description of conflict situations specified by stakeholders, development proposals, and whether there were any changes in reports preceding population management plans between regional stakeholder consultations held in 2004 and 2012.

WOLVERINE

In addressing the national population management plan and its population management area, we decided to examine responses within the reindeer husbandry area and the rest of Finland. This division was made based on the available materials. A total of 204 regional stakeholder responses were received in 2004. In the stakeholder consultation held in the autumn of 2012, wolverine rose to become a central topic of discussion primarily in the reindeer husbandry area, with far less attention in the rest of Finland. Wolverine were addressed briefly in South-eastern Finland, Oulu, North Häme, North Karelia, North Savo and coastal Ostrobothnia, where it was found that wolverine do not really cause any conflicts. In South Savo, the impacts of possible translocation efforts were addressed. This indicates the oversight of and minimal damages caused by wolverine in other parts of Finland.

In comparing the conflicts cited by stakeholders in 2004 and 2012, it can be said that the conflicts reported in the reindeer husbandry area have either remained largely unchanged or they have intensified. The increase in reindeer damages is characterised as being explosive, with the wolverine's role as the worst cause of reindeer damages being emphasised. Reindeer damages are described in great detail and the problem is presented as being wide-ranging and serious, extending to financial losses and social complications. The occurrence of illegal killing was cited in both consultations. Indifference to applicable laws has increased in situations where people feel that they have no say regarding the presence of wolverine in their own area. In Ostrobothnia, the 2012 consultation drew attention to a nascent conflict between Finnish forest reindeer and high wolverine densities in the Finnish forest reindeer area.

In both consultations, an increase in wolverine research and wolverine information, development of the carnivore damage system, and improvement of regional, national and international cooperation were suggested as development measures for population management. Translocation efforts as well as a reduction in the wolverine population in the reindeer husbandry area were proposed as individual procedural recommendations in both consultations. Derogations allowing the hunting of wolverine were demanded for both review periods, both within and outside the reindeer husbandry area. The importance of giving local people the opportunity to influence the number of wolverines in their own area was also stressed.

LYNX

The reindeer husbandry area and the rest of Finland were specified as population management areas in the national population management plan. An analysis of development proposals for lynx conflicts and population management was carried out. A total of 239 regional stakeholder responses were received in 2004. In the stakeholder consultation conducted in the autumn of 2012, the lynx was addressed in all Finnish Wildlife Agency areas.

In both population management areas and during both periods, damages caused by lynx to livestock and game rose to the forefront of lynx conflicts. Particularly where sheep husbandry and fur farms are concerned, the damages are considerable. Lynx claim a large amount of game, such as forest reindeer, white-tailed deer, hare and grouse, but it is also considered to be a nuisance to game management work by preying on animals at feed-

ing sites. As reindeer damages are a special problem in the reindeer husbandry area, they were the focus of attention in both review periods. Damages to hunting dogs and pets were cited across the rest of Finland in 2004, but also entered the reindeer husbandry area discussion in 2012.

Population growth and lynx densities increased the problems, i.e. traffic accidents involving lynx and lynx entering areas of human habitation, which is considered as problem behaviour and the sense of fear and insecurity that these create in local people were cited as major conflicts in the rest of Finland in both 2004 and 2012. The feeling of hatred towards lynx and illegal killing increased in both population management areas in 2004, and throughout the rest of Finland in 2012. During both review periods, the inflexibility of the game administration and local decision-making power were addressed in each population management area.

In considering the development proposals made, a shift in decision-making was seen during both review periods, moving from the EU level to Finland and then down to the local level, where expertise is trusted. In both population management areas, an emphasis was placed on giving local people a voice in carnivore-related matters. From a lynx population management perspective, regulation of the population by means of derogations on a population management basis was seen as being crucial to the dispersal of lynx densities. The removal of problem individuals should be handled quickly and flexibly. Preparing regional population management plans for lynx was highlighted throughout the rest of Finland during both review periods.

Improving population monitoring, increasing research, providing information and developing ways to prevent damages were addressed for the rest of Finland during both review periods and for the reindeer husbandry area at least during the second review period.

BEAR

The national population management plan specified the reindeer husbandry area, areas with an established population, dispersal zones and areas with a developing population as the bear population management areas. A total of 203 regional stakeholder responses were received in 2004. In the stakeholder consultation conducted in the autumn of 2012, the bear was addressed in all Finnish Wildlife Agency areas. An analysis of development proposals for bear conflicts and population management was made using materials according to their population management areas.

A sense of fear and insecurity was felt from the presence of bear in all population management areas except the reindeer husbandry area during both review periods. In areas with an established population and a developing population, however, concern for the incursion of bear into areas of human habitation was not mentioned until the 2012 consultation. Particularly in areas where there are high bear densities, the problems are complex. A recent analysis states that bear encounters and the resulting decrease in the recreational use of nature are a source of concern in all population management areas except the reindeer husbandry area. In the 2012 consultation, there were concerns expressed regarding the occupational safety problems of forestry professionals and beekeepers in the dispersal zones and areas with a developing population.

Economic damages caused by bear were considered a major conflict in all population management areas during both review periods. Regionally, the focus ranges from reindeer damages to bee damages, damages to bales, or sheep damages. The difficulty and expense of damage prevention as well as the slowness of the damage compensation system were seen as new causes for concern in areas with a developing population in 2012.

Bear attracted to feeding sites were a source of concern in the area with an established population during both review periods, but have become a new source of concern in the dispersal zones and areas with a developing population. One particular source of concern is habituated bears. Over the years, this problem has spread throughout the country. A recent analysis found that illegal carrion is seen as a problem in those areas with an established population and the dispersal zones.

There are also conflicts between various stakeholders where the bear population and its management are concerned. Depending on the area, disputes between hunters and tourism operators or local residents and nature conservationists are cause for concern. In the area with a developing population, there was general resistance to the idea that bear were dispersing into the area in both 2004 and 2012. At the same time, population management policies are considered to be untrustworthy. However, some progress has been made. In 2004, each of the population management areas was found to have disputes between local residents and researchers regarding the size of the bear population. According to a recent analysis, this concern has been laid to rest.

Regulating the population by means of hunting and the effective removal of problem individuals were the wishes for the development of bear population management expressed in each of the population management areas during both review periods. There was a desire to preserve the natural tendency of bear to avoid humans. Decision-making is to be kept local. Regional population management of each target population received support in the area with an established population and the dispersal zone. In the same areas, a more receptive attitude towards information coming from the field and, in general, listening to the public, was sought.

In all population management areas, the development of population monitoring, research and information was highlighted in a variety of contexts during both review periods. For example, research on the impacts of carrion baiting and the development of relevant legislation was sought.

Progress was made in the development of the damage compensation system. During the previous review period, this was wished for in every population management area, but in a more recent analysis, demands for further development were only expressed in the dispersal zone. With the exception of the reindeer husbandry area, improving damage prevention was highlighted in all areas. In the area with an established population, this was not given any mention in the 2012 analysis.

WOLF

The reindeer husbandry area, Eastern Finland and Western Finland were specified as wolf population management areas in the national population management plan. A total of 221 regional stakeholder responses were received in 2004. In the stakeholder consultation conducted in the autumn of 2012, the wolf was addressed in all Finnish Wildlife Agency areas. An analysis of development proposals for wolf conflicts and population management was made using both materials according to their population management areas.

Within the reindeer husbandry area, reindeer damage and conflicts between nature conservationists, local residents and reindeer herders were highlighted as wolf conflicts. The damages caused by wolves are also a problem in the eastern and western population management area, with the emphasis being placed on damage to livestock and hunting dogs. Wolf also claim game and, in the Finnish forest reindeer area, the endangered forest reindeer.

During both review periods, it was found that there was an excessively high number of wolves as well as a sense of fear and general insecurity resulting from their presence in the eastern and western population management area. It is generally considered unsuitable for wolf to occur in the same areas as humans and, in a recent analysis, wolf incursions into areas of human habitation were specified as a problem in both population management areas.

Cases involving the illegal killing of wolf were cited during both review periods, but not in the western population management area until 2012. Difficulties with the use of hunting dogs and the incitement of 'wolf hysteria' are new problems arising in the western population management area. In the eastern population management area, this wolf hysteria was cited in 2004, but was not mentioned at all in a more recent analysis.

The top-down setting of population management objectives and failing to listen to local residents were cited as problems in both the eastern and western population management areas in the former review period. At the same time, the antagonism between rural and urban areas was emphasised. The lack of trust between various parties as well as the lack of information, particularly problems in its exchange, were highlighted in both population management areas during both review periods.

Consideration of the development proposals for population management in all population management areas and during both review periods revealed a need to regulate the size of the wolf population by means of derogations on a population management basis and, on the other hand, to develop the procedure for derogations on a damage basis. In addition to this, there is a desire for the faster removal of problem individuals and the preservation of the natural instinct of wolves to avoid humans as well as providing everyone access to information on the real-time dispersal of wolves. In the reindeer husbandry area during the former review period and in the eastern and western population management area during both review periods, more effective methods for population censuses (e.g. increasing the use of collaring) were sought. There was a desire to take wolf-related decision-making from the EU level and return it to the national level. There is also a call to bring decision-making to the local level and develop various cooperation models. Decision-making requires immediacy and courage. Research resources are to be increased in, for example, research on wolf dispersal and behaviour, with a more effective distribution of information, particularly in the western population management area. Unlike with the

bear, the compensation procedure for wolf damages does not seem to be adequate in the western and eastern population management areas, as suggested in the 2012 analysis. There is also desire to develop methods for preventing wolf damages.

3.3.3 SOCIAL ACCEPTANCE OF THE LARGE CARNIVORE POLICY

The social acceptance of the large carnivore policy was analysed using the available research results. Illegal killing and society's support for it were used as indicators.

As the illegal killing of large carnivores is hidden, it is primarily determined by monitoring the population growth of large carnivores. By examining birth rates, natural mortality and known mortality (traffic, derogations, reported cases of illegal killing), it is possible to estimate the illegal killing pressure being exerted on a given population. Where the wolf is concerned, this is relatively easy, because the wolf is a territorial animal and, with the exception of Western Finland, it is being comprehensively tracked by collaring. During the period 2005-2010, over 30 wolves were illegally killed each year. At present, only 8.5% of the unknown losses in the wolf population are found in the information reported to the police. [67]

Where lynx are concerned, a similar estimate of illegal killing cases is currently impossible to make, because the total estimate of the lynx population and its sustainable hunting bags have not yet reached a balance.

A reduction in the bear population, particularly in the Eastern Finland area with an established population, from the highest minimum population estimate of over 700 bears in 2009-2010 to less than 400 bears in 2013, cannot be solely explained by legal hunting pressure. Where the bear is concerned, illegal killing or attempts are reported to the police with greater frequency than for other large carnivores. In requests for criminal investigations over a six-year period (2005-2010), large carnivores are represented as follows: wolverine (22), lynx (20), bear (69) and wolf (30) requests[68]. This may be due to ambiguities in bear hunting related to the use of carrion baiting or, on the other hand, it might be that the illegal killing of bear is envied due to its great utility, thus lowering the threshold for reporting incidents to the police. This also suggests that there is a greater sense of local ownership felt towards bears, thus excluding their illegal killing from the 'common good'. The illegal killing of bear is also more challenging to conceal due to their large size.

WWF Finland investigated cases involving the illegal killing of wolverine and the contributing factors in Finland during the period 2002-2008. Only five criminal offence and investigation reports concerning the illegal killing of wolverine were filed during the review period[69]. If the minimum population estimate for wolverine in the reindeer husbandry area is even close to being correct, the slow rate of growth in the wolverine population can largely be explained by illegal killing. Although the slow rate of growth in the eastern wolverine population might be due to a lack of breeding partners, illegal killing also likely plays a role.

It is clear that the illegal killing of large carnivores remains largely out of view and, therefore, does not appear in official statistics. The phenomenon is not, however, exclusive to Finland. According to estimates, two-thirds of the cases involving the illegal killing of wolf are not observed and are thus a significant indicator of wolf mortality[70]. A WWF Finland report summarises censuses made in Sweden during the period 1995–2005, indicating that a considerable number of illegal killings involving all large carnivores remain hidden, with only 4% of the reported illegal killings leading to a conviction[71].

The motives behind the illegal killing of large carnivores are largely to challenge the official population management objectives and actions, financial gain, self-defence/necessity, accident or assisting a friend or acquaintance. According to district conviction records for illegal killing over a six-year period (2005–2010), the motive of the hunting violator (n = 64) was deemed to be defying the public administration in roughly 67% of the cases. In these particular cases, the hunting violator intentionally set out to hunt the large carnivore and killed the individual, knowing precisely which species it was. The other motive behind the act was the view that the presence of the large carnivore in question was not desirable.[72] People driven by such

[67] Pohja-Mykrä M. & Kurki S. 2013: Suurpetopolitiikka kriisissä – salakaadot ja yhteisön tuki, Raportteja 98, Helsingin yliopisto, Ruralia-instituutti, Seinäjoki.

[68] Pohja-Mykrä & Kurki 2013

[69] WWF Suomi 2009: Ahmojen salakaadot Suomessa.

[70] Liberg ym. 2011. Shoot, shovel and shut up: cryptic poaching slows restoration of a large carnivore in Europe.

[71] WWF Suomi 2009.

[72] Pohja-Mykrä & Kurki 2013: Suurpetopolitiikka kriisissä – salakaadot ja yhteisön tuki, Raportteja 98, Helsingin yliopisto, Ruralia-instituutti, Seinäjoki.

motives could also be described as political criminals, and their actions do receive some public support[73].

According to the report, the same motive for illegal killing – defying the public administration – can also be seen in Sweden. Large carnivores are seen as a threat to a way of life, particularly as a competitor for game, but also as a result of the fear for one's personal safety. Large carnivores are seen as a threat to the economy, as they incur financial losses for reindeer owners, among other things. Large carnivores are also seen as a symbol of conflict between governing bodies and the governed (e.g. EU vs. local).[74]

Attitudes based on a strong emotional reaction are behind the motives for both illegal killing and the support it receives. An overwhelming sense of frustration is felt regarding the inability of lawmakers and game administration actors to ensure the security of everyday life, recreational activities and business. People also have powerful, primary emotions – fear and hate –particularly with regard to the wolf. These powerful feelings serve as the basis and catalyst for illegal killing itself as well as the support for it.[75]

According to a Finnish survey, 44% of the respondents outside the reindeer husbandry area stated that they have a fear of wolves. The majority of these respondents were highly educated, over half of whom stated that they were afraid of wolves[76]. Together with the Finnish Wildlife Agency, Metsähallitus surveyed Finns' fear of carnivores in 2009 and 2013. The results showed that there is more fear of wolf and bear now than previously. According to the survey, roughly 46% of Finns (34% in 2009) are afraid of bear and 47% (32% in 2009) are afraid of wolf. There are widely divergent opinions on claims involving large carnivores, wolves and illegal killing, with younger respondents having a more positive attitude towards large carnivores and wolves, whilst older respondents had a more negative attitude towards large carnivores/wolves and generally supported illegal killing.[77]

According to a study on the attitudes of women and hunters, the public support of illegal killing did not have an equivalent difference in the more positive attitude of younger persons. Instead, young women were more accepting of illegal killing than older women. All in all, 69% of women under 40 and 53% of women over 40 supported illegal killing. Among hunters, there were no similar differences between different age groups. All in all, 75% of hunters under 40 and 73% of hunters over 40 supported illegal killing[78]. Particularly where the wolf is concerned, hunting violators enjoyed support from their own community. It can be suggested that the culture of defiance that has sprung up around illegal killing is competing with the official carnivore policy, standing in opposition to EU carnivore policy[79]. Large carnivore policy objectives and actions have not received the same public support.

The acceptability of the large carnivore policy in the eyes of citizens has been studied before. Conducted in support of population management policies, an empirical study[80] on stakeholder and citizen attitudes and wishes for national population management showed that the protection of large carnivores is not empirically legitimate. In order for population management actions to be socioculturally acceptable, they must be carried out on the terms of people's everyday lives. The measures required for realising the strategic objectives of population management cannot, therefore, interfere with business, recreation or customary practices. At present, wolf protection is not legitimate in the sociocultural sense.[81]

Defying the large carnivore policy by illegal killing has put pressure on the development of public administration controls. During the review period, the Finnish Criminal Code was amended (232/2011) so that any illegal killing of large carni-

[73] Peltola, T., Ratamäki, O. & Pellikka, J. 2013. Salametsästys ja oikeuttamisen yhteisölliset strategiat. Teoksessa Björn, I., Jokinen, P., Kotilainen, J., Schuurman, N. & Sireni, M. (toim.) Korpisosiologi(aa). Kuopio: University Press of Eastern Finland. 208–223.

[74] Pyka, M. ym. 2007: Illegal jakt på stora rovdjur. Konflikt i laglöst land? Brå rapport No22, Brottsförebyggande rådet, Stockholm; kts. myös WWF Suomi 2007.

[75] Pohja-Mykrä & Kurki 2013: Suurpetopolitiikka kriisissä – salakaadot ja yhteisön tuki, Raportteja 98, Helsingin yliopisto, Ruralia-instituutti, Seinäjoki.

[76] Vikström, S. 2000. Suurpetoasenteet poronhoitoalueen eteläpuolisessa Suomessa vuonna 1999. Pro gradu –tutkielma, Oulun yliopisto, Maantieteen laitos.

[77] Tilaajina Metsähallitus ja Suomen riistakeskus, toteuttajana Taloustutkimus. Vastaajia 1010 kpl. <http://www.eraluvat.fi/media/dokumentit/suurpetopelot2013_ja_2009.pdf>

[78] Pohja-Mykrä & Kurki 2013

[79] Rannikko P. 2012: Susien suojelun tragedia: autoetnografinen tutkimus salametsästyksen paikallisesta hyväksyttävyydestä. Alue ja ympäristö 42(2): 70-80.

[80] Susipuhetta Suomessa, Ilveksiä ja ihmisiä, Kansalaisten karhukannat ja Asialistalla Ahma

[81] Borgström, Suvi 2011: Iso paha susi vai hyödyllinen hukka? Ekologis-juridinen näkökulma suden suojelun yhteiskunnalliseen hyväksyttävyyteen, Väitöskirja, Itä-Suomen yliopisto, Yhteiskuntatieteiden ja kauppatieteiden tiedekunta, no 20.

vores will always be treated as an aggravated hunting offence. As a result, any person convicted of illegal killing will always be sentenced to a minimum term of four months and maximum term of four years in prison. In addition, any person convicted of committing an aggravated hunting offence will be prohibited from hunting for no less than three years and no more than ten years. The indicative value of game animals was also raised in 2010 in order to make the financial or other gains of committing a hunting offence less attractive. The indicative value of large carnivores is now to be considered substantial (see section 2.2.4.).

The Criminal Code amendment also gives the police the opportunity to use remote surveillance and to acquire SMS location data to enhance the investigation of hunting offences when conducting the preliminary investigation of an aggravated hunting offence or aggravated concealing of illegally killed game. The detection of offences committed on state-owned lands is, however, the responsibility of Metsähallitus' wildlife monitoring (2005/1157). This is done in cooperation with the police and Finnish Border Guard. However, the operations of the monitoring organisation suffer from a lack of resources and expertise. Particularly in remote areas, there is a need for a strong cooperative network where the level of expertise is also kept high.

3.3.4 SOCIAL POPULATION MANAGEMENT RISKS IDENTIFIED IN THE RISK ANALYSIS

Social risk factors in the population management of large carnivores were examined in all five risk workshops. Social population management risks in many areas are related to economic and ecological population management risks. Indeed, obstacles to achieving ecological objectives arise from social conflicts. Below is a list of threats to the economic sustainability of population management addressed at the risk workshops:

- FGFRI's role is unclear, research data is not trusted and it is considered difficult to interpret.
- Problems in the functioning of Tassu has led to a mistrust of the system.
- The derogation system is considered a morass of red tape, demanding and inflexible, and identification of individuals causing damage and the short period of validity for derogations are seen as government harassment.
- National and regional media information is heavily biased and confrontational.
- Large carnivore damages cause social problems, particularly in the reindeer husbandry area.
- Large carnivore conflicts cited by stakeholders have not been resolved during the period of validity of population management plans.
- Differences of opinion between stakeholders are extremely contentious with regard to carrion baiting.
- Local and regional characteristics are not taken into consideration.
- There is not enough decision-making power at the local and regional level.
- People's fear and sense of insecurity regarding large carnivores is not taken into account seriously enough.
- With an increase in the number of bears, game wardens have had more encounters with them. These encounters have caused even extremely serious fear responses. Similar encounters have occurred with other people working in forests and carnivores.
- Intimidation and expulsion methods are not always adequate or effective (SRVA "official assistance in large game matters").
- Hatred of large carnivores increases with a lack of opportunity to influence and a feeling of frustration; attitudes towards different species also vary.
- This hatred of large carnivores culminates in illegal killing.
- Where the wolf is concerned, conflicts have spread in pace with the dispersal of wolves.
- Lack of approaches to wolverine regulation results in a feeling of frustration and illegal killing in the reindeer husbandry area

3.3.5 ACHIEVEMENT OF SOCIAL OBJECTIVES IN POPULATION MANAGEMENT

This section presents evaluators' overview of: 1) achieving the ecological population management objectives of the current large carnivore policy; and 2) the actions required for the development of future population management in order to achieve the population management objectives specified in section 4.2.

SUCCESSES

In analysing the transparency of the large carnivore policy, information was highlighted as a key factor.

- Game-related communication is handled through online publications, periodicals, the Internet and social media. People interested in the topic are provided with a wide variety of content and geographically comprehensive information on lynx, bear and wolf.
- FGFRI provides a large volume of information in publications. In game communications, carnivore research on various species, research challenges and its results as well as the carnivore researchers themselves and their work are regularly presented. This clearly meets the wishes of citizens expressed in the socio-economic study to receive information on large carnivores and the research conducted on them. This also meets the objectives set in the population management plan for providing the public with up-to-date information on research and monitoring results.
- The earlier telephone information service and current online service on wolves which allow to track the dispersal of collared wolves with a delay of a few hours is an excellent and sought-after service as well as a step towards building trust between research and the field.
- Getting various game administration actors involved in social media, where the flow of information is fast-paced and user activity is paramount, meets the need emphasised in the large carnivore population management plans for citizens to be provided with neutral, active and accurate information instead of biased and agenda-based information. Information – both factual and agenda-based – is rapidly disseminated in social media, and the various social media channels have become central gathering places for today's citizens. The adoption of social media allows for nearly real-time interaction. In social media, interaction is also transparent: anyone can pose questions or post information on large carnivores, with the response to these for everyone to see. Likewise, a lack of responses to a question or other forms of passivity can raise attention, thus forcing parties to the Finnish Game Consortium to ensure that they consistently provide information in the social media.
- Training provided by the game administration meets the requirements specified in the population management plans. The introduction of compressed air launchers and research on the use of livestock guardian dogs are outstanding examples of progress in damage prevention testing.
- The Finnish Wildlife Agency is committed to preparing ethical guidelines for carrion baiting in 2014.
- Increasing attention has been given to the fear of large carnivores. For example, a project led by the Trade Association of Finnish Forestry and Earth Moving Contractors in cooperation with Metsähallitus and the Finnish Wildlife Agency, produced an online info pack, '*Suurpeto metsätyömaalla*' ('Large carnivores at forest worksites').

According to an analysis of large carnivore policy involvement:

- Regional and national stakeholders have been heard comprehensively over a wide range of topics. After the completion of the population management plans, large carnivore consultations were held in Finnish Wildlife Agency areas throughout Finland. This has provided large carnivore policy actors with a clear idea of the views held by regional and national stakeholders regarding large carnivore population management policies.

There were also successes in the analysis of large carnivore policy acceptability:

- The bear population management plan objective for the creation of operating models to expel bear in densely populated areas was realised by establishing the Suurriistavirka-apujärjestelmä SRVA ("official assistance in large game matters").

AREAS NEEDING IMPROVEMENT:

With regard to large carnivore information, advice and training, the following development proposals arising from problems and risks should be implemented:

- Online information on large carnivores is scattered and not easily accessible. Online information should be easily accessible, understandable and accurate.
- Where the wolverine is concerned, information provided by the Finnish Game Consortium can be seen as having fallen short, as there was very little information on wolverine available. Knowledge gaps on wolverine revealed in stakeholder consultations could not be filled through these information channels during the review period.
- Trust between the FGFRI and hunters as well as the FGFRI and reindeer herders needs building. The FGFRI could also have its own column

in Metsästäjä magazine and occasional articles in the Poromies e-journal, thus regularly presenting topical matters and news on FGFRI activities and research.
- The objectivity of FGFRI researchers is widely challenged in the field. A professional communications officer should be hired to handle communications between research, the field and the media, and media training should be provided for researchers. This would also ensure that researchers could work in peace.
- Wolf monitoring should be developed so that the data on wolf dispersal can also be used in damage prevention, for example.
- Constant training in Tassu should be provided in order to maintain motivation and quality.
- At a lower game management organisation level, i.e. in game management associations, particularly in new wolf areas, there is a need for uniform guidelines and training on how to deal with people who are concerned about encounters with large carnivores.
- It is important to understand that the comprehensiveness of information and media will not make any difference if the recipients do not trust the information provider. Eliminating this mistrust is of utmost importance.

In developing the involvement of the large carnivore policy, the following development proposals arising from problems and risks should be implemented:
- Reindeer herders earning their livelihood in regions of Fell Lapland with high wolverine densities should be a priority in the objectives and actions, thus committing them to the management of the wolverine population through rights and responsibilities.
- Strong regional representation arising from the interests of stakeholders should be a priority in lynx and bear population management objectives and actions.
- The rights and responsibilities of people living within wolf territories should be a priority in wolf population management objectives and actions, committing them to the regional management of the wolf population through these objectives and actions.
- The Regional Wildlife Council serves as the central territorial or regional actor of stakeholders for regional and territorial population management.
- A new advisory body should be established at the national level. Each representative of this advisory body should be tied to at least three, but preferably four different large carnivore policy stakeholders. These representatives monitor the implementation of the new population management objectives, all the way from their transfer to the regional and territorial level to the taking of actions and results. This advisory body also monitors the establishment of local and regional psychological ownership towards large carnivores.

With regard to achieving the social acceptance of the large carnivore policy, the following development proposals arising from problems and risks should be implemented:
- The local and regional level should be committed to population management and its objectives and actions.
- At the local and regional level, there should be decision-making authority on large carnivores, population management objectives and population control measures.
- The available intimidation and expulsion methods should be rapidly deployed in response to local conflicts. SRVA ("official assistance in large game matters") activities should be further developed, particularly in order to improve preparedness and the flow of information. The role of the Finnish Emergency Response Centre Administration should be further specified and the police should be trained in order to enhance their expertise in large carnivore-related matters.
- Particularly where the wolf is concerned, it should be possible to actively intervene in regional problems, such as those involving derogations on a population management basis in densely populated areas, where the wolf is seen as a safety threat.
- Financial incentives should be widely implemented for matters involving wolf outside the reindeer husbandry area and for matters involving wolverine within the reindeer husbandry area.
- Increase in the number of game cameras in the 2000s has increased the use of carrion and other bait. Carrion is often fitted with game cameras, thus making it possible to also deal with the illegal hunting of large carnivores. On the other hand, in bear hunting it is also possible to accidently pass by carrion, which can be interpreted as illegal hunting. Carrion baiting should require a licence, even on one's own land. Limiting the carrion baiting period should also be considered so that it is prohibited in the summer and early autumn during the

bear hunting season, except for nature tourism activities. This would help in the supervision of hunting.
- Supervisory authorities, i.e. the police, Finnish Border Guard and game wardens, should be trained and interagency cooperation should be enhanced.

3.4 SUMMARY OF THE EVALUATION OF THE FINNISH NATIONAL POLICY ON LARGE CARNIVORES

Achieving the strategic objectives of the large carnivore policy was analysed from an ecological, economic and social point of view. Based on a logical frame of reference, the evaluation model highlighted the appropriateness, performance, efficiency and external factors of the policy on large carnivores. Using this logical frame of reference matrix made it possible to specify the terms for achieving strategic objectives regarding their interdependency. In the analysis conducted using the logical frame of reference, risk workshops formed an essential part of the evaluation.

This summary of the large carnivore policy evaluation will briefly discuss the questions posed in the previous development report. The actual development proposals can be found in their own section below as well as individually in sections 3.1.5, 3.2.4 and 3.3.5.

As a rule, it can be said that the actions specified in the national population management plans for large carnivores fulfil their intended purpose effectively. In this evaluation, the analysis of ecological, economic and social objectives and their achievement in the development proposals largely deals with the same matters already specified in the population management plans. In some cases, the evaluation addressed matters on a more detailed, practical level, but the broader objectives have remained within the previously set framework. This indicates that, although regional and national stakeholders were consulted in population management preparations, their views were not interpreted seriously enough. Identified conflict points and proposed development measures have been written down but, when setting the favourable conservation status, the primary conditions for setting the objective were in a situation where the range of available actions was limited. As a result, individual actions for promoting population management failed to achieve their key objective, i.e. to gain the trust and support for population management efforts from people living in large carnivore areas. The range of available actions was therefore correct, but the objectives had been wrong.

Relevance of the large carnivore policy

In analysing the relevance of the large carnivore policy, what was essential was whether the chosen processes and actions had the desired outcome and whether they could have been used to achieve the results and impacts specified for the large carnivore policy.

Large carnivore monitoring, i.e. the accuracy of the population censuses, suffers from a lack of trust between research and the field. Large carnivore monitoring requires cooperation between hunters and research as well as reindeer herders and research, but in the current situation this cooperation has, at worst, ceased altogether or, at best, is tinged with mistrust. The Tassu large carnivore observation database was estimated to be a very conflicting tool in risk analysis work. The repair of technical faults in November 2013 was the first step towards building trust, but it will not fix everything. There is a need for continuous training and motivation of local large carnivore contact persons and, particularly in the reindeer husbandry area, population censuses based on observation data are, unfortunately, not doing well.

The collar tracking of large carnivores suffers from a similar mistrust as other approaches to large carnivore observation. DNA-based population censuses should be continued and, particularly where the wolverine is concerned, employed in the reindeer husbandry area. Trust must be established in people participating in volunteer research.

The application procedure for large carnivore derogations on a damage basis and their terms have proven to be extremely challenging, thus affecting the social acceptance of large carnivores. The current derogations are valid for three weeks, as opposed to the previous two-week period of validity. This improves the situation. Making derogations on a population management basis available also for wolf and wolverine, regardless of what the population is for the entire country, would be desirable.

Compensation for damages caused by large carnivores is increasing. The amended Game Animal Damages Act (105/2009) was aimed to ease the strain placed on reindeer husbandry in particular, not only by compensating for damage to reindeer, but also compensating for the loss of calves and for exceptionally large damage to reindeer. This political decision, together with the occurrence of large carnivores, has led to an increase in compensation for damage to reindeer. Efforts to reduce reindeer

damages caused by wolf, bear and lynx have been moderately successful. Derogations can be used to prevent damage to reindeer and, in this regard, the Ministry's Decree introduced a three-year regulation. Reducing the damages caused to reindeer by wolverine is currently impossible and requires a solution to improving the acceptance of the wolverine in areas where they occur.

The measures for preventing large carnivore damages do not reach the field to the extent that there would be a reason for preventing damages. Increasing the effectiveness of prevention requires the harnessing the volunteer resources of local stakeholders, new sources of funding and information.

The variety of large carnivore information has proven successful with regard to wolf, bear and lynx. Where the wolverine is concerned, however, information has fallen short. Information channels have been effectively used. Conversely, the information on large carnivores available on the Internet, ranging from population censuses, bag limit adjustments and damages to preventive measures and research results, is confused and scattered across several different addresses. The information is also contradictory. Information is not conveyed to the field as specified in the objective, thus creating an atmosphere of mistrust between the game administration and the field as well as research and the field.

Both regional and national stakeholders have been widely consulted by means of surveys and in meetings. Established on a volunteer basis under Regional Councils, Advisory Committees on Large Carnivores also present their views on regional problems at the national level. Stakeholder views are thus amply represented. However, in analysing changes in large carnivore conflicts experienced by stakeholders during the period between 2004 and 2012 and the development measures proposed for them, it can be seen that the matters mentioned have either not changed or have even intensified. This would suggest that the views of stakeholders have not been taken into serious consideration by the game administration as they should have been.

However, it should be noted that the most important aspect of the discussion on large carnivores is whether people are experiencing problems with their presence. Although these problems can be economic in nature, they are increasingly becoming social problems. Once the threshold of social tolerance has been crossed, citizens have challenged the official population management both by illegal killing and showing support for it.

Performance of the large carnivore policy

The range of actions specified for achieving the large carnivore policy objectives is wide and aims to realise ecological, economic and social acceptability. The large carnivore actions have, however, been called into question by citizens. People do not support large carnivore policy actions carried out by actors they do not trust. This can be seen in a lack of trust in the methods used in determining populations based on large carnivore observations and the process for granting derogations, compensations for damage and the adoption of preventive measures. Not only is the large carnivore data produced not trusted, it also widely felt that local and regional views on the objectives of large carnivore population management are not reaching decision-makers. The current range of actions will not achieve the set performance objectives or large carnivore policy impact objectives unless the objectives behind these actions are changed. This change in objectives is seen as a way to gain public approval and support for large carnivore policy measures.

Efficiency of the large carnivore policy

In estimating the efficiency of the large carnivore policy, i.e. the population management objectives and actions together with the resources used for them, it can be seen that the lack of social acceptance of the large carnivore policy objectives leads to a situation in which the actions will not achieve the desired results, regardless of the amount of resources.

The large carnivore population management objectives set by the game administration should have been achieved with the resources provided. As a rule, the resources used by the Finnish game administration for large carnivores are modest compared to its neighbouring countries, Sweden and Norway, which are struggling with the same limitations in population management. The volunteer observation of large carnivores is an especially valuable research resource. Research funding has been channelled to the actions specified in the population management plans, and Finnish large carnivore research can be considered very productive in proportion to the amount of resources used. One million euros in compensation is paid in damages caused by large carnivores each year, in addition to which financial aid for the prevention of large carnivore damages is granted. Systematic wolf population management is, however, undermined by the illegal killing of wolf and society's support for it. The central role of Metsähallitus in wildlife moni-

toring and investigating cases involving the illegal killing of large carnivores requires more personnel and more training, but additional resources will not solve local defiance of the large carnivore policy arising from citizens' dissatisfaction with it. Using public law control measures, it is possible to more effectively discover illegal killings and their perpetrators as well as impose harsher sentences on them. However, it is most important to understand that the application of these enhanced measures will not influence the level of public support, which feels that illegal killing is justified. If the needs of people living in large carnivore regions are not met by public administration, these needs will be met by illegal actions taken in the field.

Impact of the large carnivore policy

The objectives for the population management of large carnivores are set in accordance with the terms for achieving favourable conservation status, as stated in the Habitats Directive. This regulatory standard based on ecological sustainability sets the conditions for the Ministry of Agriculture and Forestry within which the objectives of the Finnish national policy on large carnivores together with actions taken are applied. The strategic objectives for large carnivores on ecological, economic and social sustainability will not, however, be achieved with the current population management objectives. The objectives are set with the aim to attain a favourable conservation status. As a result, achieving social acceptance with the currently available range of actions is all but impossible. The chasm of mistrust has led to a situation in which the failure to attain social sustainability for wolf and wolverine has made it impossible to also achieve the ecological sustainability objectives for these species. The interdependency of ecological, economic and social factors must be given due consideration and the large carnivore policy objectives must be set in such a way that the actions can also be carried out.

External factors of the large carnivore policy

The risk workshops dealing with this evaluation were attended by experts to examine the risks and problems of the current large carnivore policy as well as their significance through their probability and significance (see section 1.2.1 Methods). Identified ecological risks have been compiled in section 3.1.4, identified economic risks in section 3.2.3 and identified social risks in section 3.3.4. This is a brief summary of the significance of identified risks.

In the reindeer husbandry area risk workshop, the risk group assessed the problems of the current large carnivore policy from a reindeer husbandry standpoint. As a species, wolverine was addressed primarily in the examination of development measures. The risks and problems of the current large carnivore policy were categorised in the following risk classes: insignificant or negligible (6%), moderate (23%), significant (27%) and intolerable (44%). Thus, the risks requiring active measures or immediate corrective action totalled 71%. The reindeer husbandry crisis was cited as a significant topic for deliberation in the reindeer husbandry area. Exceptionally large damage to reindeer complicates reindeer herding today in a variety of ways, from economic problems to social well-being. The future of reindeer herding is considered bleak, with younger generations giving up on it. This has an impoverishing impact on the Sámi culture and social life.

In the lynx workshop, the risks and problems seen by the risk group in the current lynx policy were categorised in the following risk classes: insignificant or negligible (8%), moderate (28%), significant (46%) and intolerable (18%). Thus, the risks requiring active measures or immediate corrective action totalled 64%.

In the bear workshop, the risks and problems seen by the risk group in the current bear policy were categorised in the following risk classes: insignificant or negligible (7%), moderate (29%), significant (45%) and intolerable (19%). Thus, the risks requiring active measures or immediate corrective action totalled 64%.

In the wolf workshop, all the risks and problems seen by the risk group in the current wolf policy were categorised in the risk classes moderate, significant or intolerable. All in all, 75% of the risks were those requiring active measures or immediate corrective action and 44% of the problems were seen as requiring immediate corrective action.

With regard to wolf policy risks, the greatest pressure was on active measures or immediate corrective actions. The situation in the reindeer husbandry area also seems pressing. Lynx and bear are seen as being less urgent. With regard to all large carnivores, approximately 80% of the problems and risks can be categorised as social risks. In addition to these, some ecological and economic risks were found to have originated from a social risk phenomenon or, alternatively, could have posed social risks if the situation had not changed. This demonstrates the clear social nature of the risks inherent in the current large carnivore policy, nearly half of which were considered probable and serious.

In analysing the external factors of the large carnivore policy, the misuse of information and conflict-oriented nature of large carnivores as a topic were highlighted. The regional and national media maintained the conflict by presenting biased news reporting. Social media channels also made it possible for people to make biased associations through the fast-paced exchange of information and opinions. In particular, the reinforcement of political objectives in maintaining the regional large carnivore conflict and the use of ecological data are considered problematic.

The large carnivore policy, whose objectives were set towards achieving a favourable conservation status, puts large carnivore actors and stakeholders in a situation where the argument for conservation is seen as being more important than any other argument. It should be noted that using ecological data as a tool for argumentation is one political approach. In analysing the large carnivore policy actions as a whole, equal consideration must be given to the arguments for economic and social sustainability.

The logical frame of reference model suggests that the identified ecological, economic and social population management risks and problems are set as future population management objectives. This objective is based on the idea presented in section 4, Paradigm shift in the policy on large carnivores, which proposes a change in the frame of reference. As a game resource, large carnivores are the 'property' of humans – the establishment of this ownership is supported by concrete actions through both rights and responsibilities.

Below is a brief summary of the factors arising in the evaluation of each large carnivore.

WOLVERINE

As there is no valid population management plan in place for wolverine, it was not possible to evaluate the success of measures taken in relation to the objectives set for them in the population management plan. However, comparisons involving the wolverine have been made in relation to the regional and national stakeholder consultations held prior to the drafting of the population management plans as well as involving available research data and conflict points identified in evaluation analyses.

There is a long way to go towards achieving ecological, economic and social sustainability in the population management of wolverine. According to a minimum population estimate, growth in the wolverine population has been extremely moderate, and the wolverine population has been divided into two subpopulations: wolverines with habitats in the northern fells and those in the eastern forests. Specifying the size of the wolverine population is extremely challenging, and very little data has been gathered on the eastern forest wolverine. Roughly half of the wolverine population is found in the reindeer husbandry area, where it poses a lot of economic problems. Indeed, the wolverine is the leading cause of damage to reindeer stock. Wolverine have been subjected to illegal killing and, without a population management plan or a special Ministry's decree, it has not been possible to manage the wolverine population by means of a derogation procedure.

There has been very little wolverine research conducted during the period under review, with the primary focus being on damages to reindeer stock caused by wolverine. Wolverine information, which is lacking and one-sided, has failed to meet the perceived needs of stakeholders.

During the period under review, damages caused by wolverine to livestock other than reindeer have been extremely minimal, primarily involving a few incidents of damages to sheep stock. On the whole, conflicts outside the reindeer husbandry area are rare, even though a nascent conflict between the Finnish forest reindeer and wolverine has been identified in the forest reindeer region.

The biggest challenge facing wolverine population management is to put reindeer herders in areas of Fell Lapland with high wolverine densities at the forefront of objectives and actions, thus committing them to management of the wolverine population through responsibilities and rights. There should be a wide range of actions available, including comprehensive and reliable methods for determining the population, an incentive-based damage compensation system, transplantations, special permits which are at least based on damages incurred but preferably also on population management, and other necessary financial incentives.

LYNX

The ecological strategic goal of lynx population management, i.e. the ecological sustainability of the lynx population, has been achieved through the application of available population management measures. Within the reindeer husbandry area, the lynx population has shown a moderate increase and, in other areas of Finland, new habitats have formed with strong, established lynx populations. At the same time, it has also been found that the ecological carrying capacity has not yet been

reached. Growth in the lynx population has given rise to the use of special permits for population management, which have been allocated to achieve a more balanced distribution of regional lynx densities as well as strengthen the economic and social sustainability of population management. Indeed, high lynx densities are precisely what cause conflicts from an economic and social sustainability standpoint. Damages to reindeer, sheep and hunting dogs caused by lynx and killing of game are economically significant and also put a strain on the tolerance of entrepreneurs and hunters towards the presence of lynx. In the reindeer husbandry area, damage-based special permits are granted for the specific purpose of preventing substantial economic damages.

For many years, the touchstone of social sustainability in lynx population management has been the unreliability of the minimum population estimate for lynx. There have been challenges in determining the lynx population and an effort has been and is still being made to meet these challenges in research and game management by developing a census method, investing in regional censuses, and scaling population management exemptions in order to control regional population growth. Undoing the deep mistrust that has formed between this research and game management as well as the 'field' is a special challenge where all large carnivores are concerned. Unreliable lynx population estimates are also reflected in questioning the reliability of other large carnivore populations.

A challenge in lynx population management is how to respond quickly to regional lynx problems. It is of utmost importance to take the sense of insecurity and fear felt about the lynx into consideration, thus avoiding the risk of the lynx falling into disrepute as vermin. Instead, the status of lynx as a valuable game animal should be promoted and preserved. The cornerstone of this approach to thinking is quota hunting. In recent years, population management derogations have served as an excellent tool for achieving economically and socially acceptable population management.

BEAR

The ecological sustainability of bear population management has been achieved by allowing the size of the bear population to grow within the dispersal zone in central parts of Finland and areas with a developing population in western parts of Finland. Conversely, derogations on a population management basis have been used to address population growth in the reindeer husbandry area and an area with an established population in Eastern Finland. Finding a balance has been a challenge and, particularly in the dispersal zone, high density areas have formed.

A local bear presence is revealed by the damages caused by bears. Bears are the biggest cause of damage to sheep stock and, of all the large carnivores, they are the only ones causing damages to honeybees and crops. In order to improve the economic sustainability of bear population management, electrified fencing, among other things, have been erected to protect property.

From a social sustainability standpoint, bears pose a challenge due to their large size and the sense of fear and insecurity this brings with it. The development of new surveying methods and, particularly, the SRVA ("official assistance in large game matters") founded during the period under review have contributed to the expulsion and killing of bears, especially those attempting to enter populated areas.

Where bears are concerned, humans have a completely different concept of property than with other large carnivores. Bears are valuable prey and bear hunting has centuries-old traditions. Even today, bear hunting is based on derogations on a population management basis, with derogations on a damage basis being granted in very few cases. Bear hunting is also a team effort, with the use of hunting dogs adding a special nuance to the hunting experience. Regional and local bear ownership is evident in situations where there has been no desire to use all possible derogations on a population management basis in an area with an established population. This suggests that responsibility for bear population growth is being assumed and, consequently, there is a feeling of regional ownership where they are concerned. Furthermore, suspected cases involving the illegal killing of bear are reported to the police with far greater frequency than the suspected illegal killing of other large carnivores. This might be an indication of the fact that the illegal killing of bear falls clearly outside the boundaries of what is considered the common good and there is no support for such activities.

The challenge facing bear population management is to keep ecological, economic and social acceptability in balance so that all these factors can be realised from a regional standpoint. This requires greater trust between research and game management as well as the 'field'. However, there is positive development where bears are concerned, which is expected to continue into the future with the current range of actions in place.

WOLF

An unprecedented collapse in the ecological sustainability of the wolf populations has been found. After the population management plan entered into effect, the wolf population for the entire country reached its peak in 2007, but has declined since then. The biggest single collapse in the wolf population occurred in 2010. The lowest level – approximately 120 individuals according to the minimum population estimate – was reported in 2013. This collapse in the wolf population has led to a situation in which no derogations on a population management basis have been granted for wolves – instead, all population management has been carried out through derogations on a damage basis. The criteria for granting the derogations in question have been found to be challenging, with the capacity utilisation of granted derogations remaining low. Citizens have also availed themselves of animal removal permits issued under the Police Act. This in itself has led to a situation where the value of wolves as prey animals has been taken away and the species is seen almost exclusively as a pest with which it is difficult to occupy the same area.

In addition to ecological sustainability, the social sustainability of the wolf population has also collapsed. Local residents feel that they have no influence in managing their livelihoods or daily routines. The presence of wolves instils a sense of fear and insecurity. Wolves are the biggest cause of damages to hunting dogs, thus making hunting more difficult throughout Finland. This is seen as a problem for social acceptability. There is a deep mistrust between the field and research and game management. These differences have made the monitoring of the wolf population more difficult due to failure to report follow-up observations and difficulty in collaring. The withholding of information on wolf observations also calls into question the minimum wolf population estimates. Questioning the position and knowledge of this research has created a situation in society where there is debate over who owns the correct information on wolves.

Where wolf population management is concerned, there is great pressure to take active measures and make immediate adjustments. The biggest challenge facing future wolf population management is to place the rights and responsibilities of people living within wolf territories at the forefront of objectives and actions, committing them to the regional management of the wolf population through these objectives and actions. This requires complete transparency in all population management measures, from objectives to action. There should also be a wide range of measures in place, including comprehensive and reliable population management methods, population management derogations and substantial economic incentives.

4 PARADIGM SHIFT IN THE POLICY ON LARGE CARNIVORES

The authors of this evaluation have been aware of the preconditions of drafting a large carnivore policy. These preconditions, however, are not factors for restricting ideas but the necessary development measures have been presented whenever there was a need for them.

The practical proposals related to establishing psychological ownership were made by experts at risk workshops, which served as a tool for supporting this evaluation. The chosen development proposals are, however, an overview of the necessary actions held solely by the evaluators. The practical actions of the development proposals, their implementation and the required resources remain at the discretion of the party commissioning this evaluation.

4.1 FACTORS BEHIND THE SHIFT

For centuries, the practice of game management and entrepreneurship has been based on the right and, especially for wolves, the responsibility to remove any large carnivores that disturb or threaten these activities. The fear and economic damage that these large carnivores cause were taken very seriously and as a joint effort. Society supported and encouraged the removal of large carnivores by offering hunting bounties and using professional hunters to solve regional problems. Wolf hunters in particular were considered to be benefactors for their respective communities.[82]

Declining large carnivore populations in the beginning of the 1900s and the general awakening of the public's environmental and conservation consciousness, also concerning large carnivores, gradually led to substantial changes in cultural thinking[83]. The old ways of thinking were dismantled by game management, researchers and conservationists, with closed game seasons being set for large carnivore species requiring protection[84]. The centuries-old classification of harmful species and the hunting bounty system were abolished and, for example, the general hunting right for wolverine, wolf and bear ended in 1993 (1993/615). Finland ratified several international conservation agreements[85], which obligated it to achieve a favourable conservation status for the large carnivore populations. Over the past few decades, there arose a cultural way of thinking typical of our time, which assumes that the favourable conservation status based on conservation objectives is the only right large carnivore policy objective. Any deviation from this would be considered a failure.

Discussion and interaction between, on one hand, hunters and large carnivore policy actors and, on the other, reindeer herders and large carnivore policy actors, have become strained over these same decades. Hunters view the FGFRI as a conservation organisation, whose mandate is considered to be the promotion of conservation efforts. Reindeer herders see the Ministry of Agriculture and Forestry as representing population management as a conservation objective[86]. These conservation objectives conflict with the hunters' traditional management and administration of game resources as well as an understanding of Sámi culture[87]. These segments of the 'field' will be subordinate to authorities and researchers for as long as large carnivore policy activities are considered the one and only way to achieve a favourable conservation status for large carnivores. This is strongly tied to

[82] Mykrä S., Vuorisalo T. & Pohja-Mykrä M. 2005. Species classifications in Finnish hunting legislation: the history of organized persecution and conservation, Oryx 39:3, 275-283; Pohja-Mykrä M., Vuorisalo T. & Mykrä S. 2005: Hunting bounties as a key measure for historical wildlife management and game conservation: Finnish bounty schemes in 1647- 1975, Oryx 39:3, 284-291

[83] Ilvesviita, P. 2005: Paaluraudoista kotkansuojeluun. Suomalainen metsästyspolitiikka 1865–1993. – Lapin yliopistopaino, Rovaniemi.

[84] Mykrä S., Pohja-Mykrä M, & Vuorisalo T. 2012. The emergence of species conservation in Finland: development of wildlife attitudes, Conservation and Society, käsikirjoitus.

[85] Bern Convention; Biodiversity Convention; 92/43/EEC

[86] Magga, A-M 2012: Pedot – monimuotoisen luonnon osa vai saamelaisen poronhoidon voimatto-muuden symboli? Petokäsitykset ja diskurssit saamelaisten poronhoitajien ja suurpetojen suojelua ajavan diskurssikoalition välisessä petokiistassa vuosina 2010-2011, Pro gradu –tutkielma, Saamelainen kulttuuri, Giellagas-instituutti, Oulun yliopisto.

[87] Magga, P.2007: Rakennuksia, kotasijoja, muistoja. Teoksessa Elo, T. & Magga, P. (toim.) 2007: Eletty, koettu maisema: näkökulmia saamelaiseen kulttuurimaisemaan. Suomen ympäristö 34/2007. Lapin ympäristökeskus, Rovaniemi. 11–24.

the idea that the reason behind the local defiance and questioning of the large carnivore policy is a lack of information and misguided opinions at the local level, for which the only remedy is to increase information and public administration control.

The large carnivore population management objectives and actions are executed in a top-down manner and, therefore, lack place-based policies. Local and regional views concerning the objectives and actions of the national policy on large carnivores have not influenced decision-making as desired. During the preparation of the wolf population management plan, rural residents living in wolf territories felt that they had no voice in the decision-making affecting their living environment and were members of a lower social stratum than people living in urban areas[88]. The multifaceted conflict related to large carnivores is manifested in strained relationships between local communities and central government, residents of rural and urban areas, and ordinary citizens and researchers. The denial of national population management objectives and growing mistrust between the field and authorities as well as the field and researchers have made systematic population management impossible, particularly where wolves and wolverine are concerned.

Both regional and temporal differences can be found in attitudes towards large carnivore species. In terms of illegal killing and population changes, the conflict can be seen as being particularly serious in eastern parts of Finland, where the large carnivore populations have been strong for decades, as well as in the reindeer husbandry area, where the objectives and actions of reindeer herding have conflicted with the presence of large carnivores. With large carnivore populations gradually dispersing into more densely populated areas, however, the vocal resistance to large carnivores in Western Finland has received a considerable amount of attention. The primary motive for illegal killing – defying public administration – is largely due to frustration with public administration objectives and actions. This frustration in the lack of opportunities to influence the large carnivore situation in one's own living environment has led to a social situation in which large carnivore population management is actively defied by illegal killing and, in the case of wolves, passively defied by the tacit acceptance of illegal killing [89]. This tacit acceptance of hunting violators and illegal killing given by the public is extremely significant.

Even if the achievement of a favourable conservation status is made the primary indicator of population management objectives, international conservation agreements emphasise the use of social sustainability indicators as a precondition for conservation. The importance of social sustainability to large carnivore policy actions has recently received a great deal of attention and has been taken into account in the drafting of national and international policies[90].

Society's response to large carnivore policy actions suggests that social sustainability will inevitably be the typical approach to cultural thinking. Coexisting with large carnivores is not a question of how many wolves, bears, wolverine or lynx occur in the area. It is about how many people are having problems with their presence. There is a need to get rid of our current way of thinking, which says that the conservation objective of a favourable conservation status is the one and only objective of the large carnivore policy. It must be understood that achieving a favourable social status is no less important as a large carnivore policy objective. Without social sustainability, there can be no ecological sustainability. This gives value to the experience of everyday living and doing business. Transitions in society have been taken into consideration in this evaluation (see also section 2.2.1.) and the paradigm shift based on building the social sustainability of large carnivore population management serves as the basis for all development measures.

4.2 NEW OBJECTIVES FOR THE POLICY ON LARGE CARNIVORES

The objective for large carnivore policy development actions can be summarised as follows: the primary objective of Finland's large carnivore population management is sustainable population development. The measures carried out should take

[88] Bisi, J. & Kurki, S. 2005. Susipuhetta Suomessa. Julkaisuja 3, Maaseudun tutkimus ja koulutuskeskus, Helsingin yliopisto, Seinäjoki.

[89] Rannikko P. 2012: Susien suojelun tragedia: autoetnografinen tutkimus salametsästyksen paikallisesta hyväksyttävyydestä. Alue ja ympäristö 42(2): 70-80; Pohja-Mykrä M. & Kurki S. 2013: Suurpetopolitiikka kriisissä – salakaadot ja yhteisön tuki, Raportteja 98, Helsingin yliopisto, Ruralia-instituutti, Seinäjoki.

[90] mm. A manifesto for Large Carnivore Conservation in Europe, 6/2013; The Standing Committee of the Convention on the Conservation of European Wildlife and Natural Habitats; En hållbar rovdjurspolitik, Prop. 2012/13:191 [http://www.regeringen.se/content/1/c6/22/34/51/cc53f145.pdf]

into consideration social, ecological and economic demands and special regional and local features.

The above-mentioned summary differs from the current objective in that achieving favourable conservation status is no longer the primary objective of large carnivore population management but, rather, this is now sustainable population development. This sustainable development objective is a core area of the Bern Convention on Biological Diversity. The objective of the Habitats Directive is also to promote the general objective of sustainable development. In sustainable development, ecological, economic and social factors are given equal consideration in both objectives and actions, with these three aspects being interdependent. Thus, the objective does not give more weight to ecological objectives than social objectives. This is also in line with the findings of this evaluation, according to which exceeding social tolerance will undermine systematic population management built upon the ecological strategic objective.

The current large carnivore policy risks and problems highlighted in the evaluation have been set as objectives for the future large carnivore policy. These objectives are achieved with a shift in paradigm and operating approach, which is described in the following section (4.2.1 Developing psychological ownership).

4.2.1 DEVELOPING PSYCHOLOGICAL OWNERSHIP (PO)

The current conservative, top-down approach to decision-making must be phased out. National, regional and local objectives and actions should be synchronised with one another. The primary goal of managing large carnivore populations must be to develop the psychological ownership of large carnivores, particularly at the local and regional level, but also at the national level. The psychological ownership of large carnivores is more effectively developed in situations where ownership involves a sense of community and responsibility. A sense of ownership is created through practical measures involving rights and responsibilities, thus affecting attitudes[91]. Significance is attached to large carnivores, thus making them 'our large carnivores'[92].

This requires a place-based and problem-based approach in which natural resources are considered property whose management carries with it rights and responsibilities. Concrete responsibilities must be required and rights should be given regionally and locally, taking into account the differences specific to each species. All actions taken should be entirely transparent. It should be noted that responsibility cannot be demanded without new rights, and rights cannot be granted without demanding responsibility (Figure 18). Developing psychological ownership requires trust across all boundaries and between actors.[93]

This section discusses the developing of ownership, presenting detailed proposals for new operating approaches. It should be noted, as the logical frame of reference model suggests, that the identified ecological, economic and social population management risks and problems are set as future population management objectives. These objectives (i.e. development proposals), which are presented in sections 3.1.5, 3.2.4 and 3.3.5, must be set as new large carnivore policy objectives in equal measure. All of these development proposals are placed under the heading of responsibilities, rights or trust in order that they can be used to develop large carnivore ownership.

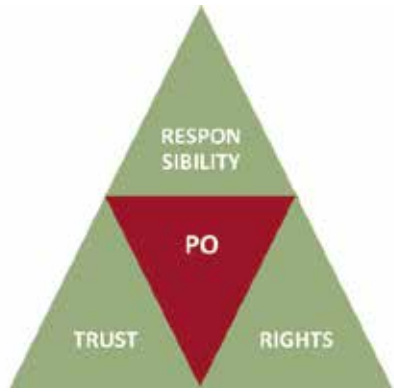


Figure 18. Developing large carnivore psychological ownership (PO) through trust, responsibilities and rights.

[91] Pierce J.L., Kostova T. & Dirks, K.T. 2001: Towards a theory of psychological ownership in organizations. Academy of Management review 26: 298 – 310.

[92] Matilainen, A. & Lähdesmäki, M. 2009: Nature-based entrepreneurship in private forests – The preconditions for the sustainable co-operation between private forest owners and entrepreneurs. Ruralia-instituutti, Helsingin yliopisto, Seinäjoki.; Lähdesmäki & Matilainen 2013. Born to be a forest owner? An empirical study of the aspects of psychological ownership in the context of inherited forsts in Finland. Scandinavian Journal of Forest Research, hyväksytty julkaistavaksi.

[93] Pierce ym. 2001; Pierce J.L., Kostova T. & Dirks, K.T. 2003: The state of psychological ownership: Integrating and extending a century of research. Review of General Psychology 7: 84 – 107.

PLACE-BASED AND PROBLEM-BASED APPROACH

As the nature of large carnivore conflicts varies regionally and temporally, a great deal of weight was given to the differences between large carnivore species and various regions in the development proposals. This is a place-based approach to large carnivore policy development.

When giving consideration to regional population management, regional diversity must be recognised and regional factors and needs must be taken into account. Conflicts involving large carnivores are local and depend not only on the presence of carnivores, but also on other game resources, livelihoods and infrastructure as well as cultural capital and traditions.

Large carnivore policy actions should be targeted precisely, directly and quickly at local needs. Regional cooperation forums with the ability to respond quickly, along with regional or territorial population management plans, are considered key factors for problem-based solutions to large carnivore conflicts. Regional actions should stem from local needs as well as activate and involve local and/or regional stakeholders, depending on the species of large carnivore and reason for the conflict. It is possible to integrate public funding and joint stakeholder volunteer work in population management actions.

Measures proposed later for developing psychological ownership include building trust, sharing responsibility and granting rights. All these measures are used to enhance regional and local cooperation and networking.

The place-based and problem-based approach organisation diagram is shown in Figure 19.

The **national population management plans** for large carnivores must specify the national framework for population management, but also facilitate a sufficiently flexible operating environment for regional population management plans.

The regional population management plans for large carnivores must be subordinate to the national population management plans, but independent enough to allow for special regional features.

Regional population management plans facilitate rapid responses to regional and local conflict points. This also lowers the threshold for taking special regional wishes and points of interest into consideration. Regional activities should be easily approached, transparent and user-friendly. Creating a transparent innovation environment strengthens pilot activity. The launching, monitoring, assessment and development of pilot research and projects lay the foundation for flexible regional distribution. The spreading of good practices from one region to another should be facilitated. Functioning at a local or provincial level also allows for more effective control of risks.

Regional lynx and bear population management plans and their implementation are prepared in interaction and cooperation primarily at the level of Finnish Wildlife Agency areas in regional stakeholder cooperative bodies. However, where the wolf is concerned, this is done in territorial stakeholder cooperative bodies and, for wolverine, in stakeholder cooperative bodies in key reindeer husbandry areas.

Regional Wildlife Councils play a key actor role in the preparation and implementation of regional population management plans. Tasks specified for Regional Wildlife Councils in the Wildlife and Game Administration Decree (171/2011) facilitate this body's active and central role in identifying regional problems and bringing regional and local stakeholders together. However, there is good reason to give attention to existing Advisory Committees on Large Carnivores supervised by Regional Councils and the utilisation of their structures at the regional level.

When appointing stakeholder representatives for a second term in Regional Wildlife Councils, consideration should be given to the members' strong commitment to large carnivores, with the population management of large carnivores being given particular attention during that three-year period.

It should be noted that the Regional Wildlife Councils' own representation, which is comprised of no more than ten people, is not sufficient enough to form a regional opinion. The Regional Wildlife Councils should also involve local actors in regional deliberations and use forums to facilitate a broad-based representation of stakeholders so that conflict points are comprehensively addressed and activities can be organised extensively. Where the wolf is concerned, special attention should be given to people living within the wolf territory and, where the wolverine is concerned, attention should be given to reindeer herders.

The Secretary General plays a key role in creating synergies between national and regional population management plans and maintaining a dynamic level of activity. As specified in the Wildlife and Game Administration Act, matters to be addressed in meetings are prepared and presented by an officer of the Finnish Wildlife Agency. In this case, a Secretary General of the Finnish Wildlife

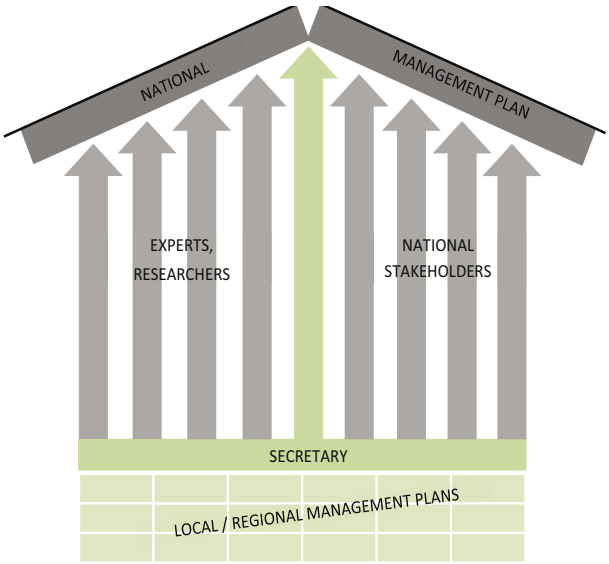


Figure 19. Place-based and problem-based organisation model

Agency should be appointed. Special attention should be given to ensuring successful recruitment when appointing the Secretary General.

TRUST

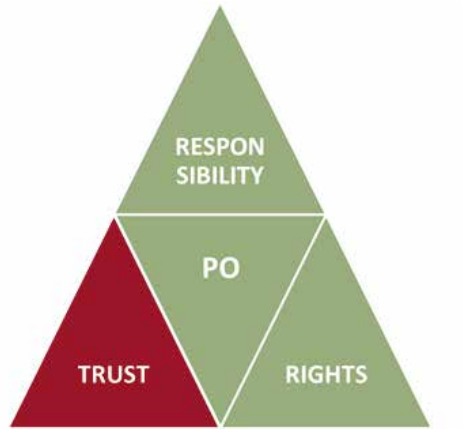
Building trust is of utmost importance in developing psychological ownership. In order for people to feel a sense of psychological ownership towards large carnivores, they should be given open access to information on them. The sense of ownership is also enhanced through information[94]. Firstly, researchers, authorities and actors from the field should earn the trust placed in them. Secondly, researchers, authorities and the field should trust one another. This is accomplished by the mutual sharing information and practices. This primarily means true transparency in all game administration functions, from objectives and field implementation to reporting. This can only be achieved by creating new operating models for producing and sharing information.

1) Recruiting communications officers

It is extremely important to recruit professional communications officers to serve between research/game administration and the authorities, research/game administration and the field, and research/game administration and the media.

2) Recruiting regional research assistants

The hiring of an FGFRI research assistant to serve Western Finland in dealing with conflict situations between the authorities, research institutes, hunters and local people is seen as an outstanding step towards a more sustainable large carnivore policy. Although the work itself is focused primarily on wolf, it can be extended to other large carnivores when necessary[95]. In this evaluation, this face-to-face conflict management is considered vital. Consequently, it is recommended that similar practices should also be implemented in other parts of Finland.



[94] Pierce J.L., Kostova T. & Dirks, K.T. 2001: Towards a theory of psychological ownership in organizations. Academy of Management review 26: 298–310.

[95] Kts. Martikainen, M. 2013: Susidiplomatiaa Länsi-Suomessa. Metsästäjä 6: 28-29.

3) Information sharing portal

The fragmentation of information and difficulty in locating it, inconsistency with figures, and incomprehensibility of the information provided must be rectified. The recommendation for doing this is the creation of a single portal for sharing information, with free access to all. Systematic information on large carnivores, the large carnivore policy and population management actions, from preventive measures to compensation paid for damages, should be provided on the information sharing portal. Research data should also be popularised through this portal.

Sharing up-to-date research data

Accurate, up-to-date research data is shared through the portal. Particularly where the wolf is concerned, timely information on the dispersal of collared wolves should be shared. Information on carnivore damages as well as successes and failures in preventive measures taken should also be shared. The portal serves as an information resource both regionally and nationally.

Popularisation of research data

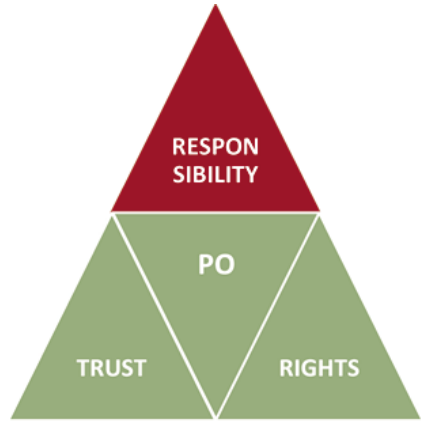
The production and interpretation of game-related research data is unfamiliar to many people. This should be taken into consideration in applications and the collection of data by providing straightforward information on an easily located and accessible information sharing portal. At the same time, it should be ensured that interested parties have easy access to actual research sources.

5) Enhancing the use of social media and blogs in game administration

Social media has become a major tool for sharing information. This challenge has to be given due consideration. Social media and game administration blogs can be used to bypass biased regional and national media and target entries precisely on the audience seeking information using these channels. The professional use of social media can also reach new segments of the population. Game administration personnel should be trained in the use of social media.

RESPONSIBILITIES

Sharing and assuming responsibility is a vital function in developing the ownership of large carnivores. In order to feel a sense of psychological ownership towards large carnivores, people should have concrete responsibility for them. Responsibility for large carnivore populations in their respective areas should be divided regionally or locally according to the species of large carnivores. It should be noted that sharing and assuming responsibility also give rights, which are described in greater detail below, under 'Rights'.



1) Involving stakeholders in decision-making

Where the wolverine is concerned, special responsibility is given to regional stakeholders in the reindeer husbandry area. These stakeholders should participate in joint decision-making concerning regional population size objectives, planning damage prevention, planning translocation, scaling and allocating derogations, and the equitable distribution of economic incentives. Regional stakeholders outside the reindeer husbandry area assume responsibility for regional population size objectives, damage prevention, supporting translocation, bag limit adjustments and allocation, and the equitable distribution of economic incentives.

Where bear and lynx are concerned, regional stakeholders should participate in joint decision-making concerning regional population size objectives, planning damage prevention, and bag limit adjustments and allocation.

Where the wolf is concerned, territorial stakeholders should participate in joint decision-making concerning the number of individuals per territory, planning damage prevention, applying for derogations, bag limit adjustments and allocation, and the equitable distribution of economic incentives. Territories suitable for wolf can be modelled. When breeding wolf pairs form a pack in a new area, a territorial stakeholder representation should be quickly assigned to that area, followed by a territorial population management plan.

2) Population census

The research objectives for producing accurate population data should be promoted by facilitating research in the field, for example, with tracking collars and by participating in local censuses. Personnel should be familiarised with use of the large carnivore observation database and reporting large carnivore observations in the area according to the prescribed model.

The game administration is responsible for the support and continuous training of hunter volunteers in order to maintain motivation and ensure a proper standard. Incentives should be used to develop cooperation.

In the reindeer husbandry area, the making of large carnivore observations should be developed and, in particular, wolverine litters should be studied. Where the wolverine is concerned, the possibility of adopting the population census model used in the reindeer husbandry area should be investigated. In this model, the total estimate of the wolverine population is based on confirmed wolverine litters and estimated wolverine dispersal across national borders. This is why it is important to use DNA testing in determining wolverine dispersal between different countries. This requires increased cooperation in the reindeer husbandry area and it facilitates the adoption of a territorial compensation model.

Training in the identification of wolverine tracks outside the reindeer husbandry area should be provided, especially to hunters.

In order to achieve place-based and problem-based population management objectives, regional and local population management censuses should be tested. The implementation of good practices in new areas should be facilitated.

3) Local expertise and cooperation

As with other local-level policies, the large carnivore policy requires committed actors and expertise. After Finland joined the European Union in 1995, a strong project culture has sprung up in its rural areas, with expert organisations and experts in project work located all over the country. Various habitat restoration projects and other local environmental conservation projects have already been implemented in several EU programmes (EFRD, ESF, Rural Development Programme projects). Local implementation of the large carnivore policy could be included as a theme in local (e.g. LEADER) and regional development projects. Concrete local objectives and actions could be created through projects.

4) Preventing damages

Materials required for preventing large carnivore damages, such as fences, should remain fully subsidised for entrepreneurs. With regard to non-wage compensation for work, a model should be found in which regional stakeholders can be organised to perform work on a volunteer basis. The damage compensation method must be changed to a model in which prevention measures must be taken by those with access to free assistance. This should be a prerequisite for receiving compensation. Full compensation should be paid in cases where the preventive measures were properly carried out.

Human safety

SRVA ("official assistance in large game matters") activities are maintained, cooperation models are developed and participants are trained to meet regional needs.

Regional population management plans specify how the safety of the residents will be ensured. For example, school transport should be guaranteed to those who need it. This should be taken into account in the national wolf population management plan. Making municipalities pay the costs of school transport will create regional inequities. These costs should be covered by state funds.

Translocation

The gene flow between Finland's northern and eastern wolverine populations should be greater than it currently is in order for the viability of the wolverine population to be considered secure for the future[96]. The translocation of wolverine should be continued, focusing on reindeer herding cooperative areas, where the wolverine population and damages caused by wolverine are the largest.

5) Bag limit adjustments and allocation

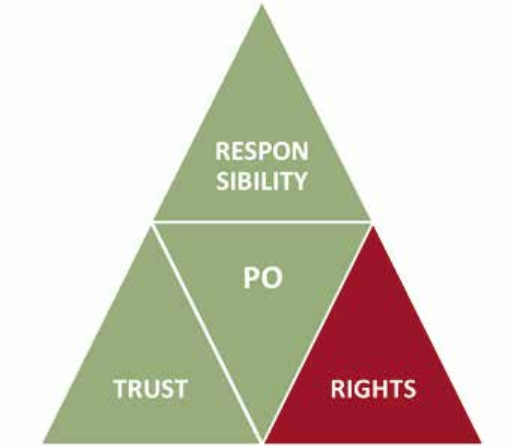
Regional stakeholders and regional population management plans are responsible for the social, economic and ecological sustainability of large carnivore population management. Bag limit adjustments and allocation should be used within the limits of the best available information and actions specified in the national population management plan.

In accordance with the place-based and problem-based population management approach, local densities or local safety threats should be addressed with derogations on a population management basis, also where wolverine and wolf are concerned.

[96] Koskela Anni 2013: Wolverine habitat selection, diet and conservation. Väitöskirja, Genetics acta universitatis ouluensis; a scientia e rerum naturalium 614.

RIGHTS

Rights pertaining to large carnivore populations in one's own area should be granted regionally and locally. Granting rights has a significant impact on creating a sense of psychological ownership. It should be noted that with the sharing and receiving of rights comes regional and local responsibilities, which are described in greater detail above, under 'Responsibilities'.



1) Involving stakeholders in decision-making

Stakeholders are involved in decision-making through regional stakeholder meetings. They have the right to participate in setting tolerable regional or local large carnivore population limits.

Removal of high densities of species

Where the wolverine is concerned, it should be possible to receive derogations on a population management basis in the reindeer husbandry area if wolverine occur there and cause reindeer damage and wolverine translocation is underway.

Where the wolf is concerned, local high densities or local safety threats should be dealt with using derogations on a population management basis.

2) More flexibility in use of the various population census methods

If there is a desire to conduct a joint census in a given region, this should be supported for research purposes. At the regional level, the right to conduct population census pilots should be ensured, based on needs expressed by the field.

3) Direct damage compensation

The amount of compensation paid to reindeer herders for the loss of calves has risen in recent years, at worst to over EUR 7 million a year. Reindeer damages affect approximately 1,000 reindeer herders each year. As the funds allocated for compensation are insufficient, additional funding must be sought from the supplementary budget each year. With regard to this, it should be noted that it is possible to forecast compensation amounts. Therefore, a model making it possible to apply for the full amount of compensation in the first instance should be developed, thus allowing for faster payment of compensation for reindeer damages.

With the exception of reindeer damages, the damages caused by large carnivores are moderate in terms of euros. However, it should be noted that these damages affect a large number of entrepreneurs and hunters each year. In addition, encounters with large carnivores cause concern and fear. Damage compensation in the reindeer husbandry area and the rest of Finland should be kept separate from one another, so that compensation can be paid based on the specific needs of each area. This would allow for the direct compensation for damages outside the reindeer husbandry area.

4) Territorial compensation model

Financial compensation is considered a key aspect of sharing rights. Economic incentives should be adopted in cases involving wolf and wolverine.

Wolverine in the reindeer husbandry area

The reindeer husbandry area has a special responsibility for the development of the wolverine population, which should be taken into account when giving consideration to the development of damage compensation. Implementation of a territorial compensation model for wolverine in the reindeer husbandry area should be investigated and tested in areas with high densities. The translocation of wolverine should be continued, focusing on reindeer husbandry areas, where the wolverine population and damages caused by wolverine are the largest. In wolverine territories where there is a joint effort to translocate wolverine, it should also be possible to remove wolverine by means of derogations, regardless of the wolverine situation for the entire country. In accordance with the derogation terms, a substantial 'bounty' should be paid to the reindeer herding cooperative in question for wolverine removed.

Wolf
The revision of the wolf population management plan has been prepared by the Finnish Wildlife Agency independently, even though at the same time as this evaluation[97]. The idea of 'wolf territory trading', which is linked to natural values trading, is highlighted in the Finnish Wildlife Agency plans. The proposed measures do not conflict with the development proposals presented in this evaluation.

People living in an area where there is a wolf pack with cubs are paid compensation. One condition for receiving this compensation is that at least one member of the pack is collared. This also facilitates the real-time tracking of pack dispersal and the provision of information on them. A substantial 'bounty' should be paid to residents of a given territory for wolves hunted in accordance with the terms of derogations granted for that territory.

Sanctions clause
In developing the use of economic incentives for wolverine and wolf derogations, a 'sanctions clause' in support of the responsibility to be assumed for these species is proposed. If any wolverines or wolves are killed illegally in a given territory, no bounty will be paid for their killing under derogations in that area. This sanction can be commensurate, so that one bounty is lost for each confirmed case of illegal killing.

5) Rapid response to problem individuals
Regionally and locally, residents should be able to trust that game authorities and the police will respond quickly to any incursion of large carnivores into areas of human habitation as well as to individuals causing economic damage. This particular aspect of SRVA ("official assistance in large game matters") activities should equally support sparsely and densely populated areas.

6) Valuable game animal
An effort should be made to prevent large carnivores from being stigmatized as vermin. The status of valuable game animals is maintained and enhanced by population management hunting, which should be sought for all large carnivores.

Where lynx and bear are concerned, regional population management targets are met by allowing as much freedom as possible in scaling and allocating regional hunting derogations. High densities should be dispersed quickly.

Where the wolf is concerned, population management should be handled by means of hunting. Everyone should have an equal opportunity to participate in wolf hunts. A territorial stakeholder representation decides on the selection method. Communal hunting supports the development of a sense of ownership.

Hunting wolverine under a derogation on a damage basis should be possible in Fell Lapland. The forms of participation and selection methods are determined by reindeer herding cooperative representatives together with the game administration. The long-term goal should be hunting for the purpose of population management.

4.2.2 EVALUATING THE SUCCESS OF POPULATION MANAGEMENT

A socially acceptable population size for all large carnivore species is used as an indicator in evaluating the success of population management. Various tools to verify this include repeated surveys and changes in the number of illegal killings, both in official statistics and other calculations.

Developing the sense of psychological ownership should be evaluated by means of research. This research framework should be initiated before beginning the revision of the wolf population management plan.

The economic investment in both the game administration and private persons should be reasonable, and damage trends should be monitored. The long-term objective for large carnivore populations is ecological sustainability.

A new national advisory body, with each of the representatives tied to at least three but preferably four different large carnivore policy stakeholders, supervises the implementation, actions and achievements of the new population management objectives. This advisory body also monitors the establishment of local and regional ownership.

[97] cf.. Orava, R. 2013: Luonnonvarakaupalla sudet haitasta hyödyksi. Pääkirjoitus, Metsästäjä 6: 3; Statement Jarkko Nurmi 29.11.2013

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Scandinavian Brown Bear Research Project, <http://www.bearproject.info/>

ScandLynx, The Scandinavian Lynx Project, http://scandlynx.nina.no/scandlynxeng/Home.aspx

Skandulv - Scandinavian Wolf Project, <http://skandulv.nina.no/english/Home.aspx/>

Suden kanta-arvioinnin menetelmät <http://www.rktl.fi/riista/suurpedot/susi/suden_kanta_arvioinnin/>

Susien pantaseuranta http://pantaseuranta.rktl.fi/

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INTERNATIONAL AGREEMENTS AND RECOMMENDATIONS

Bern Convention (Convention on the Conservation of European Wildlife and Natural Habitats)
Biodiversity Convention (Convention on Biological Diversity)
CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora)
European Union CITES Regulation (338/1997)
Habitats Directive (**Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora**)
Recommendations and statements issued by parties to the Bern Convention:
Recommendation No. 59 (1997) on the Drafting and Implementation of Action Plans of Wild Fauna Species <http://www1.nina.no/lcie_new/pdf/634989787742957547_COE%20Bern%20convention%20activities%20on%20field%20of%20large%20carnivores%202003.pdf>
Recommendation No. 115 (2005) of the Standing Committee, adopted on 1 December 2005, on the conservation and management of transboundary populations of large carnivores.
Recommendation No. 137 (2008) of the Standing Committee, adopted on 27 November 2008, on population level of large carnivores in Europe.
Recommendation No. 163 (2012) of the Standing Committee, adopted on 30 November 2012, on the management of expanding populations of large carnivores in Europe. <https://wcd.coe.int/ViewDoc.jsp?id=2010757&Site=&BackColorInternet=B9BDEE&BackColorIntranet=FFCD4F&BackColorLogged=FFC679>
A manifesto for Large Carnivore Conservation in Europe, 6/2013 <https://wcd.coe.int/com.instranet.InstraServlet?command=com.instranet.CmdBlobGet&InstranetImage=2370514&SecMode=1&DocId=2065886&Usage=2>

ACTS AND DECREES

Act on Wildlife Monitoring Conducted by Metsähallitus (2005/1157)
Act on the Finnish Game and Fisheries Research Institute (1987/1131).
Act on the Amendment of Chapter 48 a of the Criminal Code (232/2011)
Nature Conservation Act (1096/1996)
Nature Conservation Decree (160/1997)
Ministry of Agriculture and Forestry decree on the indicative value of live game animals (241/2010)
Hunting Act (615/1993)
Hunting Decree (666/1993).
Wildlife and Game Administration Act (158/2011)
Wildlife and Game Administration Decree (171/2011)
Game Animal Damages Act (105/2009)
Criminal Code of Finland (391/899)
Government Decree on Derogations Laid Down in the Hunting Act (169/2011 and 452/2013).

IN ADDITION

Statement issued by the Deputy Ombudsman (Rec. no 612/4/04), Police procedures in wolf-related matters, 25 October 2004.
Chancellor of Justice Paavo Nikula decision 13 July 1999 (Reg. no. 11/21/98) – People must be protected from carnivores.

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